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THE STORY OF THE RANGE

By

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An account of the occupation of the public domain ranges by the pioneer stockmen, the effect on the forage and the land of unrestricted grazing, and the attempts that have been made to regulate grazing practice and perpetuate the great natural forage resources of the open ranges

Reprinted, 1926, from Part 6 of the Hearings before a Subcommittee of the Committee on Public Lands and Surveys, United States Senate, Sixty-ninth Congress, First Session, pursuant to Senate Resolution 347, to investigate all matters pertaining to National Forests and the Public Domain and their administration.

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THE STORY OF THE RANGE

What Pastures Mean to the Nation

Wherever man has set foot on this globe the grazing of domestic animals—first the cow and then the horse, sheep, and hog—has been the first form of agriculture practiced. As has been well said, "The cow has always been the advance agent of civilization." With few exceptions she found her whole living in the woods and open places about the pioneers' settlement. Later, as improved pastures were furnished, she harvested the crops herself, and when fat she and her offspring furnished their own transportation to market. Alive she furnished one of the most nourishing foods known; dead she furnished meat and wearing apparel.

Pasturage for livestock has always been an indispensable source of commodities essential to life. To-day, in spite of all our intensive agricultural practices, the production of meat, hides, and wool by grazing animals is the cheapest, most economical method known. With comparatively little attention from the owners, the grazing animals harvest and store away the forage crops, meantime fertilizing the areas over which they graze. Take from England her pasture lands and her livestock business would be almost a thing of the past. Take from the farmers of the United States their pastures and livestock and our whole agricultural structure would fall. It is seldom appreciated how large a part grazing and pastures play in our farm practices, or how much of our animal production is due almost wholly to pasture lands.

To the uninitiated the word "pasture" implies grass as the one food for the grazing animals. This is not always the case, however. Pasturage is defined by students of the subject as follows:

"Pasturage includes all herbaceous feed gathered directly by domestic animals. When the plants are shrubs or trees the pasture is called 'browse.' Feed consisting of acorns and other nuts that have fallen from forest trees is termed 'mast.' This term is also extended to include the berries of palm trees and the seeds of pine trees."[1]

Horses on pasture as a rule are almost exclusively grass eaters. Cattle are more catholic in their tastes, eating grass, weeds, and browse, according to the character of the range. On the average range or pasture grass forms about 70 per cent of the feed of cattle, with browse next and weeds the last resort.

On the other hand, sheep find fully 75 per cent of their forage in the so-called weeds, principally wild flowers and the succulent plants other than grass. The Minnesota Experiment Station discovered that out of 480 varieties of weeds in that State sheep ate no less than 430. Goats prefer browse, and under ordinary conditions will make their diet largely on that class of forage.

Inasmuch as cattle form by far the greatest number of our grazing animals, it is evident that grass is the chief pasture and range plant in this country.

One of the most inspiring as well as charming tributes to grass was written by an illustrious son of the West, the late John J. Ingalls, United States Senator from Kansas.

GRASS

"Next in importance to the divine profusion of water, light, and air, those three physical facts which render existence possible, may be reckoned the universal beneficence of grass. Lying in the sunshine among the buttercups and dandelions of May, scarcely higher in intelligence than those minute tenants of that mimic wilderness, our earliest recollections are of grass, and when the fitful fever is ended, and the foolish wrangle of the market and the forum is closed, grass heals over the scar which our descent into the bosom of the earth has made, and the carpet of the infant becomes the blanket of the dead.

[1] Year Book, Dept. Agr., 1923, p. 365.

"Grass is the forgiveness of nature—her constant benediction. Fields trampled with battle, saturated with blood, torn with the ruts of cannon, grow green again with grass, and carnage is forgotten. Streets abandoned by traffic become grass grown, like rural lanes, and are obliterated. Forests decay, harvests perish, flowers vanish, but grass is immortal. Beleaguered by the sullen hosts of winter it withdraws into the impregnable fortress of its subterranean vitality and emerges upon the solicitation of spring. Sown by winds, by wandering birds, propagated by the subtle horticulture of the elements which are its ministers and servants, it softens the rude outlines of the world. It invades the solitude of deserts, climbs the inaccessible slopes and pinnacles of mountains, and modifies the history, character, and destiny of nations. Unobtrusive and patient, it has immortal vigor and aggression. Banished from the thoroughfares and fields, it bides its time to return, and when the vigilance is relaxed or the dynasty has perished it silently resumes the throne from which it has been expelled but which it never abdicates. It bears no blazonry of bloom to charm the senses with fragrance or splendor, but its homely hue is more enchanting than the lily or the rose. It yields no fruit in earth or air, yet should its harvest fail for a single year famine would depopulate the world."

Pasture Land in the United States

According to the best authorities "the area of land in the United States used for grazing, excluding crop lands pastured part of the year, is about 1,055,000,000 acres, or 55 per cent of the total area of this country."[1] This method of land utilization "contributes nearly as much to the sustenance of our livestock as all the crops combined." (Ibid.) On the basis of rental values of pasture lands all over the United States the cost of this feed is several times less than where crops are fed. In spit of this fact the study and scientific research work so far done in this country, as it relates to the use of these great areas for purely pasturage purposes, is decidedly small when compared to the work done in other lines of agriculture, especially crop production. Here and there some excellent work has been done, but by and large the value of pastures in the production of meat has been given comparatively little consideration.

Any study of the proper utilization of the remaining acres of our once so-called "limitless" public domain is a purely pasturage problem. Of the remaining 186,000,000 acres now in the hands of the Federal Government as of June 30, 1924, practically all of which lies in the arid and semiarid regions west of the one hundredth meridian, a very small percentage can ever be utilized for crop production under any agricultural methods at present known or even remotely imagined. Eager citizens have combed these areas over and over and have cut the very heart out of them in search of a piece of land upon which they could locate, produce agricultural crops, and make a home for themselves and families. It is not there to-day. They recalled the stories of their fathers and grandfathers of the rich lands once open to settlement in States like Iowa, Illinois, and the Dakotas. They found instead only an arid climate, lands more or less infested with alkali and other injurious elements, no water for irrigation except at costs now wholly prohibitive, and surroundings generally inhospitable and unattractive.

In addition to the large amount of public domain land there is over 400,000,000 acres of the same class of land in the arid and semiarid regions of the West in other than Federal ownership. This includes State lands, Indian reservations, homesteads, and unimproved privately owned farm lands upon which domestic animals are grazed, and for all of which some definite, carefully planned scheme of grazing management is yet to be worked out. (Year Book, U. S. Dept. Agr. 1923, p. 367.)

Speaking of this land, its needs, and character, one writer has said:

"It is largely a producing area from which stockers and feeders go to the Corn Belt or other fattening areas. Factors influencing economical production vary widely between regions, and even within regions there is no uniformity between ranges as to their value for carrying livestock, the period of most satisfactory use, or the system of grazing to apply."[2]

The problem of the proper utilization of the public domain is therefore tied in intimately with the use of more than twice as much land of similar char-

[1] Yearbook, Dept. of Agr., 1923.
[2] Chapline, W. R. A National Program of Range Research.

acter in State or private ownership. Any study of the one is bound to benefit and increase values in the other. Hence, whatever is done with the public domain to make it fill its highest possible use in our national scheme of agriculture will have far-reaching effect on the whole arid region of this country.

THE OCCUPATION OF THE RANGE

FIRST IMPORTATIONS OF LIVESTOCK IN THE SOUTHWEST

Some years previous to the landing of the first settlers at Jamestown, another group of Europeans had gained a foothold on the extreme southwestern part of the continent and were grazing large numbers of livestock.

We have definite records to the effect that Cortes, the Spanish adventurer, landed 16 head of horses on this continent somewhere in the vicinity of Vera Cruz, on the eastern coast of Mexico, early in 1515. His report even gives the name, color, sex, and character of each horse. He may have brought with him some cattle also, but there is no positive record of the landing of cattle in that region earlier than 1521. In that year, according to reliable records, Gregorio Villalobos, sent to New Spain as governor general, landed troops and supplies near Vera Cruz. The written report of the expedition states that "he brought a number of calves (oviese ganado) from San Domingo, he being the first to bring them to 'New Spain.'" (Hacketts Historical Documents.)

Nearly all the early expeditions to New Spain, or what is now called Mexico, landed first at some of the West Indies for rest or recuperation and later reshipped to New Spain. Villalobos evidently got his animals from this source.

From the documentary evidence obtainable, the livestock landed in Mexico must have prospered amazingly, the grassy plains adjacent to the coast furnishing almost unlimited range, with a mild even climate. In 1538 Mendoza, then Viceroy of New Spain, reported to the Spanish King as to the advancement of the new colony. In this document, among other matters, he speaks specifically of the fine condition of his cattle, horses, and Merino sheep, which he had imported from Spain. The sheep had been especially prolific.

On February 23, 1540, when Coronado, the Spanish captain general, left the little town of Compostello, on the west coast of Mexico, on his celebrated expedition to the northeast, he took with him large numbers of livestock. All the historians of this expedition agree closely as to the numbers of horses and mules taken along. Coronado had with him "about 300 horses for his soldiers, more than 1,000 horses and mules for pack animals" and * * * "large droves of big ganado mejor and little cattle—y ganado menor (sheep) and hogs." (Castenadas "Narrative" Winship Translation. 14th Annual Report Bureau of Ethnology.)

The Spaniards pushed north from their base in New Spain, carrying with them livestock of every kind. Both Bernal Diaz and Castenada, who wrote of these expeditions, mention the carrying with them of numbers of livestock, sheep, cattle, horses, and even hogs. These were driven along with the troops to be used as food when needed and to stock up the ranges around the settlements which they made at strategic points. When Coronado started from northeastern New Mexico on his wonderful march across the prairies of Colorado and Kansas, he took with him, according to Castenada's history, "1,000 horses and 500 of our cows and more than 5,000 rams and ewes." (Ibid.)

Coronado's expedition marks unquestionably the year, 1540, in which sheep and cattle first came to this region, now part of the United States.

In 1555, about 36 years after the first livestock were landed on this continent, an adventurous Englishman, Robert Tomson by name, who had been trading with the Spaniards for many years, found his way into New Spain. In his letters to England he mentions the livestock in the new country.

"There is in New Spain," he writes, "a marvelous increase of cattell which dayly do increase and they are of greater growth than ours. You may have a great steer that hath a hundred weight of tallow for 16 shillings and some one man hath 20,000 head of cattell of his own. They have great increase of sheep in like manner. They have much woole and as goode as the woole in Spain. They have many horses, mares, and mules which the Spaniards brought thither (Mexico). They have as good jennets as any are in Spain, better and cheaper than they be in Spain." (Vol. 3, p. 544, Thomson's Narrative in Hakluyt Voyages, Edition of 1600.)

He visited the city of Mexico and wrote of his experiences there. "Beef, mutton, hennes, capons, such like all are very good and cheape—to say the whole quarter of an oxe as much as a slave can carry away from the butchers for 2 shillings 6 pence and a fat sheepe at the butchers for 3 royals, which is 18 pence and no more."

Livestock in the new world must indeed have done well to be so cheap and plentiful in so short a period of time.

From Mexico the line of settlements spread in two directions, north along the Pacific coast where were founded many Franciscan missions, and northeast up along the Rio Grande into what is now New Mexico and Arizona. Another stream of exploration took the Spanish along the Gulf coast up into the rich coastal plains of Texas. From these various settlements of the Spanish the livestock industry of the Southwest spread gradually until it finally met and merged with the livestock from the East. This mating of the herds of the East and West marked the conquest by the adventurous pioneer stockman of the "Great American Desert."

FIRST IMPORTATIONS OF LIVESTOCK ON THE EASTERN COAST OF NORTH AMERICA

In 1545 some Portuguese fishermen and explorers are reported to have landed a few cattle, including probably some sheep and hogs, on Cape Breton Island. These were later carried to Newfoundland and the adjacent mainland. This was undoubtedly the first reported placing of livestock on the eastern coast of North America.

We know positively that in 1598 the Marquis de la Roche left a colony of French on Sable Island, which lies to the southeast of Cape Breton Island. Here they found wild cattle and sheep. On the beach of Sable Island these Frenchmen found remains of some wrecked Spanish ships which had been sent to that region several years before to make settlement. The French, knowing nothing of the Portugese landing, assumed that the wild animals they found were some of the stock the Spanish had had with them and which had escaped from the wrecked vessels, reached shore, and made themselves at home in their new environment. Incidentally, these Frenchmen built boats from the Spanish wrecks and with them made their way back to France.

Thirty-five years later, or about 1633, John Rose, an Englishman, was cast ashore on Sable Island. Rose estimated the total number of livestock then on that island at about 800 head of all kinds. He finally got away from Sable Island and reached Boston. Two years later, in 1635, two vessels, the *James* and the *Rebecca*, of Boston, went to look for these islands. They found a French colony already there who had slaughtered most of the stock for food. The American captains estimated the total number of livestock left at not above 140 head. Beginnings of Agriculture in America. Carrier, 103.)

In the meantime the English and Dutch colonies that were being established along the eastern coast of the present United States were bringing livestock in the ships with the colonists.

There is no actual record to show that the first ships landing at Jamestown on May 13, 1607, brought livestock. The indications are that they did not. The first authentic statement on this subject is found in a letter written from the Colony of Virginia by M. G. Aucher, dated August 31, 1609, describing his voyage to the colony from England: "On May 15, 1609, seven sail left (Woolich, England). Arrived Plymouth 20th day. We took into the *Blessing*, being the ship wherein I went 6 mares and 2 horses." (Wallace "The Horse in America.")

The winters following the first landings were severe. The colonists suffered for food and evidently were forced to eat their livestock to preserve their own lives. The governor of the colony in a report to the home company dated July 7, 1610, made the following statement: "Our people * * * the last winter destroyed and killed all our hogs. * * * there was not above one sow left alive * * * and our horses and mares they had eaten with the first." (Ibid.)

In a "Report of a Voyage to Virginia" dated November 13, 1611, by M. G. Auhcer, the following statement is found: "They brought to this colony 100 cows, 200 pigs, 100 goats, and 17 horses and mares." (Ibid.)

This evidently refers to other importations of livestock arriving at Jamestown early in 1611 of which we have a definite record.

The Dutch who settled New Amsterdam in 1625 "brought with them 103 head of cattle." (Ibid.)

In 1629 the founders of the Massachusetts Bay Colony sent six vessels loaded with emigrants and livestock "including 25 mares and stallions." (Ibid.)

In 1638 the Swedes and Finns planted a colony along the Delaware River, bringing with them a number of horses and other livestock.

"In 1643 a full cargo of horses was landed at New Amsterdam from the Dutch West Indies." (Ibid.)

These last were not riding horses as were most of the Virginia stock, but according to one writer (Van der Douck) were heavier than the English horses "and intended for husbandry."

From this date on in all the early histories there are frequent references to shipments of livestock arriving on the east coast of the new country. That some of these animals must have thrived is indicaed by an act of the Virginia Legislature of September, 1632, to the effect that:

"Noe man shall kill any wild swyne out of the forest or woods except without leave or license from the governor." (Hennings "Statutes at Large for Virginia.")

It is evident therefore that the first landings on this continent of domestic animals, cattle, sheep, horses, and hogs, occurred in the far Southwest fully 25 years earlier than on the Atlantic coast.

GRAZING ON THE EAST COAST IN COLONIAL TIMES

Owing to the nature of the grasses and herbage, as well as the character of the country itself, the business of grazing livestock under open range conditions has been much less extensive east of the Mississippi River than in the West. Climatic conditions in the eastern part of the United States make it nearly impossible to utilize the forage and grasses all the year round, and as a rule they must be harvested, cured, and stored for winter use. Nevertheless we have definite records of year-round grazing of eastern ranges along the Atlantic coast showing that domestic livestock has used with more or less success ranges in Virginia, Georgia, the Carolinas, and adjoining colonies during the entire year without artificial feeding of any kind.

Forced to clear the land along the coast at a heavy labor cost, the early settlers at first concentrated principally on raising enough food for themselves and families to carry them through the long, cold winters. Thus they could not provide hay and other forage for the domestic animals and these were perforce turned loose in the forests to shift for themselves.

In 1661 in Maryland there were many bands of wild cattle—that is, unmarked (unbranded) animals—roaming in the woods about the settlements in that colony, and permission was granted for hunting them, the profits being divided between the hunter and the "Lord Proprietor." They eventually had to repeal this law, presumably because the hunters were careless and failed to distinguish between branded and unbranded stock. (Beginnings of Agriculture in the United States. Carrier.)

Speaking of the Virginia Colonies, Sanford (Agriculture in the United States) says:

"In the interior much stock, especially cattle and hogs, ran wild in the woods. * * * In the spring many were so weak they could not rise. It was one of the farmers' jobs to lift the poor cattle onto their feet. It was only later on that the custom of providing hay and other feeds for the long winters became general."

This was in the years between 1775 and 1785, and the records indicate that about the same conditions prevailed in all the colonies along the Atlantic coast.

Despite the handicaps under which the stock ranged at large, they evidently multiplied rapidly. In this connection Carrier (Beginnings of Agriculture in the United States) says:

"Cattle production (in Georgia) increased at a rapid rate. A round up at Ebenezer in 1740 brought in 500 animals of all ages, and it was said that twice that number might have been collected if they had had more men and horses to do the work.

"These cattle ranches of Georgia and the other southern colonies took on the same general character which prevailed a century later in the Great Plains area. There were annual round-ups and branding of calves, conflicts between overlapping interests, and long drives of herds to tidewater markets. Cattle rustlers plied their trade, and were summarily dealt with when caught. Might

was the law of the range then, as later. These cattlemen, ever alert, always armed, fearless, and resourceful, were an effective protection to the tidewater planters against attacks from the Indians of the Mississippi region. Those interested in the history of the cattle ranges of the Great Plains will find its beginnings in colonial times in the South as well as in the Spanish ranches of the Southwest."

The cowboys of that time roped and rode as those of to-day. Hardy and reckless, they were the "rough riders" of colonial times. The Battle of the "Cowpens" in July, 1781, was on a well-known round-up and branding ground, and many of the best troops fighting against the British forces were those cowboys of the southeastern colonies.

The following comments on the livestock conditions as they existed in 1775 and earlier are taken from an interesting old book, "American Husbandry," by "An American," published in 1775. The writer, an English gentleman farmer, a close observer and evidently well informed on farming affairs, gives in great detail his impressions of agricultural conditions in the Colonies at that time.

"Neither the English nor Swedes in New Jersey and New York colonies have stables. Their cattle are obliged to stay day and night in the fields during the whole winter. The Germans and the Dutch have preserved the customs of their country and generally keep their cattle in stables during the winter" (p. 133).

* * * * * * *

"Many of the planters, especially in the back part of the Province (Pennsylvania), where the wild cattle are, keep great stocks of cattle; some of them have four or five hundred head of horned cattle * * *; they let these run through the woods not only in summer but also in winter" (p. 167).

* * * * * * *

"Two great circumstances which give the farmers of North Carolina such a superiority over the other colonies are, first, the plenty of land; and, secondly, the vast herds of cattle kept by the planters. It is not an uncommon thing to see one man the master of from 300 to 1,200, and even 2,000 cattle, cows, bulls, oxen, and young cattle" (p. 336).

An interesting phase of this subject is that even in those early days there were herds of wild horses running at large on the open ranges, "escapes" from the colonists' stock, which were as great a problem to the settlers at that time as are the wild horses that at the present time are so abundant on many western ranges. They graze in large numbers on the public domain, to the injury of the forage plants and greatly interfering with the proper management of the settlers' stock.

Beverly's "History of Virginia" alludes to this as follows:

"There is another kind of sport, and that is the hunting of wild horses. You must know that they have many horses foaled in the woods that * * * are as shy as any savage creature. Those having no mark upon them belong to him who first takes them," etc.

MEETING OF THE HERDS OF THE EAST AND WEST

As the lower and more open range in the East came under the plow the cattle herds were forced farther and farther back until, following the line of least resistance, they took the western course, crossed the Alleghenies and followed closely the fringe of frontier settlements to the Missouri.

In the latter part of the seventies the West awoke to the opportunities offered for raising cattle and sheep upon the open ranges that lay west of the Missouri River from the Mexican to the Canadian line. Great cattle companies were formed in the East and in Europe, the promoters of which went into Texas and bought thousands of long-horned cattle and moved them north onto the virgin unoccupied ranges. Those were the great years of the Texas trails, during which that huge State disgorged hundreds of thousands of her surplus cattle into the new unstocked ranges to the north. Millions were invested in the enterprise, and for a few years millions were made, principally in speculation, promotion, and on paper.

The stockmen of the West were a prodigal as well as a restless lot. With what seemed an almost unlimited world in front of them, they resented the crowding that began to develop, and there was a constant pushing forward

farther and farther out into the prairies. They disputed with the Indian and the buffalo for the occupancy of the land, with the result that always followed where the white man came. The red man and his friend, the buffalo, slowly melted away, and eventually the tide from the West which had its origin in the Spanish settlements in southwestern Texas and along the Rio Grande in New Mexico met the advance from the East. In the Southwest they met along the Rio Grande in New Mexico and Colorado; to the northwest those that crowded over the Cascades in Oregon and Washington met the advancing tide from the East pouring over the backbone of the Rockies, and the frontier was no more.

THE INEVITABLE HAPPENS—OVERGRAZING AND DISASTER

The long-horns from the West met and mingled with the better breeds from the East, spreading out over the entire region, until finally, about 1895, no open range remained unstocked. Not an acre of grazing land was left unoccupied, and ranges that for permanent and regular use would have been fully stocked with a cow to every 40 acres were loaded until they were carrying one to every 10 acres. Into western Kansas, Nebraska, eastern Colorado, out into the Red Desert country of Wyoming and Utah, up across Montana and the two Dakotas clear to the Canadian line, they pressed in their mad search for grass. No one provided any feed for the winter, the owners preferring to risk the losses. Gradually the native grasses disappeared. As fast as a blade of grass showed above the ground some hungry animal gnawed it off. A few men sounded a note of alarm, but most of the owners declined to realize the approaching disaster and drifted along in their fancied opulence.

Then came the inevitable. The winter of 1886 saw the almost total extinction of the industry in some of the Northwestern States. Thousands of cattle went into that winter never to see the spring flowers again. Great cattle companies with managers riding back and forth to the frontier towns in coaches and six, drawing princely salaries for doing nothing, went out of existence. Millions of dollars were lost beyond hope of recovery. A few years later, in 1893, the Southwest went through the same experience, and still greater losses were piled up against the industry.

THE ERA OF READJUSTMENT

Then there came a gradual readjustment of the business. Many of the great companies operating on borrowed money went to the wall, and the remnants of their herds were bought up by men whose faith in the business still was strong. From that time to this the business of raising cattle upon the open ranges has been a fluctuating one. Man's greed to obtain something for nothing has never yet allowed him to be content with a moderate profit. Each man looked upon the range forage as something he must grab before anyone else could reach it. Hence the grasses were given no chance to grow, and a few good years were followed by a bad one which wiped out all the profits. What the winter storms did not kill, the "bog holes" caught in the spring.

THE COMING OF THE RANGE SHEEPMAN

Along in the early nineties the sheepmen began to gain a foothold on the ranges, especially in the Northwestern States. Gradually they forced the cows back from their old ranges, and many long-headed cowmen in sheer self-defense turned their cattle into sheep and joined the ranks of the woolgrowers. The sheepman was much more able to cope with the elements than was the cattleman. He had his herd under his eye at all times, and could move it to better feed before the animals became too weak to travel. He also found out much earlier than did the cattleman that buying feed against a hard winter was money well invested. In many ways the sheepmen profited by the bitter experiences of the cattlemen and avoided many of their pitfalls.

The ranges were tentatively divided, and in some of the States, especially Wyoming, Montana, and Idaho, the sheepmen have gradually forced the cattle interests into the background.

RANGE WARS

Meantime the tide of settlement under the homestead and other land laws was overflowing the western prairies. The newcomers divided the ranges with those already there. The pioneer sheep and cattle owners, in disgust at the crowding process, trailed their herds from one part of the range to another in search of fresh feed. Here and there homesteaders located along the streams so as to control the watering places. Competition for the ranges became fiercer and fiercer. Armed men fought for the control of the ranges they had learned to call their own. Fierce conflicts occurred in the Blue Mountains of Oregon; in Wyoming there was the "Johnson County war," followed by what has been called the "Upper Green River war," and other outbreaks. In Arizona the Tonto Basin war inside of a few years cost about 40 lives and terrorized a great range region. These range wars, the sheep dead line in western Colorado, and local disturbances in other parts of the range States, marked the end of the "free and open public range." These outbreaks were especially serious where the opposing elements were the owners of sheep on one side and cattle on the other, and they constituted by far the greatest number of cases.

Occasionally, as in the Johnson County troubles in Wyoming, the friction was wholly between the advancing settlers, "nesters" as they were called, on one hand and the range cattlemen on the other. Many settlers were locating sites chiefly valuable as watering places for range stock. In many parts of the West some of the streams were in deep canyons. There were occasionally breaks in the canyon walls and the streams flowed for a mile or two in through an open country, allowing the range stock to reach the water. Two or three men by locating "shoestring" homesteads along the banks of such streams could effectually close the water so that stock could not reach it except by crossing the homesteaders' lands. Many such locations were made primarily for hold-up purposes, and naturally the stockmen made reprisals on the settlers in various ways. In many cases the lands were unsurveyed, therefore could not be legally entered by anyone, and the settler held his land by force of arms only. To buy him out did not mean a permanent solution of the trouble, for unless the purchaser lived upon the area himself or hired some employee to do it for him the place could be taken up by the next newcomer and the old trouble would break out afresh.

Not infrequently operators of large livestock companies who placed hired men upon such locations to hold them found their confidence misplaced; for the man, realizing he could not be held to any contract, would himself either sell out to some other person or else repeat the hold-up process with his employer.

Where the land was especially valuable for stock-watering purposes, a certain class of land script which could be placed on unsurveyed land was used, but it was an expensive process and only to be used where the range so controlled by the watering place was worth the cost.

Fortunately for the progress of the range industry, in later years when the national forests were established the Forest Service was able to put an end to these conflicts. The service is proud of the fact that in the 20 years the forest officers have been handling grazing on these areas there has been but one armed conflict between the cattlemen and sheepmen.

WASTEFUL RANGE METHODS

No matter what class of stock was grazed, whether sheep, cattle, or horses, the owners "gave no heed for the morrow." It was a clear case of "first come first served and the devil take the hindmost." No man could lay claim legally to a single acre of the public domain ranges, except the comparatively small spots taken up under the homestead laws and which were generally used only for headquarters or to produce a little winter feed for the saddle horses, milk cows, and other domestic animals about the settler's home.

Nobody dared save an acre for future uses, knowing full well it would be sought out by some nomad with a hungry band of stock, and the feed eaten off to the grass roots in spite of the protests of the party of the first part. "Its as much mine as yours" was the common answer to such protests. After such an experience nobody found it worth while to save a piece of range for his stock or leave a single blade of grass on the ground when he moved his stock in the fall.

A FEW STACKS OF HAY ARE AN INSURANCE AGAINST WINTER LOSSES THAT HAVE NEVER YET FAILED TO JUSTIFY THEIR COST

1589

Every spring the herds of sheep followed the melting snows into the high mountain meadows just as soon as the ground was uncovered. Not a thought was given to the tiny leaves of the forage plants just poking their tender points out of the soft, wet soil. The hungry sheep fed it off just as fast as it grew, and their sharp hoofs trampled and cut up the sod until bare wastes took the place of grassy meadows and bunchgrass hillsides. Here again it was first come first served. From the pinnacles the owners watched with jealous eyes each other's progress into the high ranges. By day the cloud of dust that rose above the migrating herds, and by night the fires built to keep off the predatory animals, showed the advance of the rival herds. Also, the fires were seldom extinguished when the herd moved on, and as the forest burned an added devastation followed the stockmen's course into the mountains.

The average band in the early days numbered from 2,500 to 3,000 head of dry sheep—far too many to be handled properly or graze on the range without injuring the forage plants. The owners saved the wages of one herder perhaps, but lost far more in other ways, not counting the damage such great masses of animals did to the range, a thing to which unfortunately they gave little heed.

Perhaps the stockmen of those pioneer days should not be held to too strict an accountability for their range practices. It was all a new proposition to them. Few of them knew the first rudiments of forage growth or plant requirements. They mostly grew up with the pioneer idea that when the feed in a certain region was gone there was more "over the range" to which they could move their herds and flocks.

This reckless competition could not have but one end. The mountains were turned into dust heaps; the old forage plants were gnawed to the roots and so weakened that they failed to grow. Worthless weeds and annuals took their place. The willows along the streams and meadows were eaten down to walking sticks. The meadows, stripped of their green covering, dried out. The forage cover gone, the freshets tore through the meadows leaving great gashes in the sod and soil, which cut down deeper and deeper, draining the land as successfully as any Corn Belt farmer ever drained his water-logged fields with machinery and tiling. Then the areas grew brilliant under purple iris, a sure sign of forage-plant decadence in a mountain meadow, and their value for grazing purposes was almost gone.

Down in the open plains much the same process was followed. In the early days when surface water was scarce many large areas could be grazed only when snow was on the ground and the snow banks could be used for watering places. Mostly these were the winter ranges that under usual conditions were free from grazing animals all summer long. This gave the forage plants an opportunity to grow up under normal conditions and cure on the ground for winter use. Thus when the stock came down from the mountains in the fall they found the fresh winter ranges waiting for them, stocked with feed enough to last through the long nongrowing season.

As the herds increased and the need for additional range became a serious matter, the stockmen went into these winter ranges and built reservoirs or dams in which they impounded the flood waters during the spring months when the snows were melting or caught the summer floods in the summer rainy seasons.

At first they meant to use these ranges during the winter only; but as they had no control over them stockmen from other points drove their herds onto them and used the water so kindly provided. Thus in a very short time these winter ranges that should have been kept as reserve pastures intact and unused during the summer months were being grazed the year round.

PIONEER WORK OF THE FOREST SERVICE

It is well to mention here the real constructive pioneering work which the Forest Service has done for the management of livestock on the open ranges. Never before in the history of any nation had this subject been taken up by a government force in a constructive manner and methods of control put into effect that had for their purpose the protection of the forage cover on lands in public ownership. Indeed, very little had ever been done along these lines on private lands. It was a new science and a new field of adventure. It called for a complete overturning of venerable and long-established ideas and methods. There were neither precedents nor guides to follow; the men in

charge built up their system of regulated grazing from the very foundation stones.

Day by day the men who handled the grazing of livestock on the national forests built up their system. They met and solved each problem as it came up. They created a new nomenclature of grazing terms. They trained an educated body of technical and practical grazing experts. They made errors but were quick to profit by them. Their job sprang into being almost overnight. In a comparatively short space of time millions of acres of public land, used for over 50 years by western stockmen without let or hindrance for the grazing of their sheep or cattle, were placed under almost absolute control.

That the majority of the western range stockmen did not take kindly to this new scheme of Government supervision and for several years were decidedly hostile to the idea did not make the situation any less difficult. But the men of the Forest Service thrived on discouragement and criticism. They never admitted defeat and were never for a moment inclined to swerve from what they felt was their duty to the Nation as they saw it.

In the last few years every civilized nation in the world has sent its experts and scientists to this country to study the methods of the Forest Service in handling the livestock on large open ranges. Men from India, Sweden, Norway, Germany, Japan, England, China, and Russia have come to the service as the fountainhead of information on grazing matters.

When the national forests were established, the rules and regulations of the Forest Service, which require permittees to own a certain amount of cultivated land and water for livestock and to produce sufficient forage to carry their stock through the winter period, automatically cut out of the forest ranges a large number of stock, especially sheep owned by men whose nomadic natures rebelled against the investment of a dollar in lands of any kind. They had used the public domain so many years without oversight or supervision that they could not grasp the fact that a new era in the western grazing ranges had come about. They would not accept any of the restrictions as to management of their herds while on the forest areas, which the grazing experts of the Forest Service felt were necessary to protect the timber, revegetate the almost ruined ranges, and keep the stock from suffering from hunger during the winter period. "Why should we be compelled to provide a ton of hay for each cow or for every so many sheep?" they asked. "If the stock die on the winter ranges for lack of feed, it's not the business of the Forest Service to stop it. It's our loss, not theirs." These men, unable to secure permits on the forests, turned to the public domain as a last resort.

But the men of the Forest Service persisted in their requirements as to providing feed for winter. They felt the loss of livestock was not wholly a private matter. The Nation was interested in conservation of every kind. Dead sheep or cattle furnished neither wool nor beef. The lack of foresight or indifference on the part of the livestock owners, was in the judgment of these foresters, something with which the whole Nation was concerned. They could not enforce their ideas upon everybody, but inasmuch as they were able to take care of only about a third of the livestock in the several range States in which national forests were situated, it became a question of deciding as to which of a number of applicants should be granted the grazing privileges. This enabled them to select for permittees those progressive stockmen who owned such lands.

Through this selective process, they had a fine opportunity to carry out their ideas as to range and animal conservation. So they furnished grazing to those men only who could show they met the Forest Service requirements as to the provision for feeding the animals in winter should the need arrive. That such a plan was sound has been shown repeatedly, but possibly never so clearly as during the winter and spring of 1919–20. Probably no more serious range conditions have ever been known throughout the western range States, generally than obtained that winter and spring. The losses among sheep and cattle were unprecedently heavy in spite of thousands of dollars spent for supplemental feed.

It was noticeable, however, that the stockmen who held permits on national forest ranges were better provided for such an emergency than their neighbors. The requirements of the Forest Service had obliged them to own farm lands and show a production of forage crops consistent with the number of livestock they owned. In consequence of this obligation, these permittee stockmen had the feed on hand ready for use, and thus did not suffer losses as heavy as did their neighbors not so well equipped for a hard winter. Under prevailing

use of the open ranges throughout the far West, no stockman should go into a winter without some supply of feed located as near his winter ranges as is possible. A big stack of hay is an insurance against loss that has never yet failed to justify its cost.

Effect on the Forage Cover of Unregulated Grazing

From the beginning of history there has been frequent comment on the damage to ground cover, forage plants, and general vegetation caused by unrestricted, uncontrolled grazing of livestock, in every part of the civilized world. Some of the earliest references to this matter are clearly set forth in the books of the Old Testament.

When in their distress from the devastating droughts in Canaan, Joseph's brothers came to him for help, he took them to the great Pharaoh, whose favorite he was at that time. But, before he did so, the wily Joseph suggested that when the King inquired as to their business, they should say that their trade had been about cattle and that they wished to dwell in the Land of Goshen.

"For," said Joseph, "every shepherd is an abomination to the Egyptians." (Genesis: 46.)

The Land of Goshen was a triangular-shaped piece of country, bounded on the south by the line of the present Suez Canal, on the west by the Nile, and on the north by the Lake of Menzaleh. It is possible that it was set aside as a special sheep-grazing area, and thus kept that class of stock from injuring the other ranges used by the Egyptians for grazing their camels and cattle. Even in those days, however, the sheepmasters seem to have had their troubles through too many stock on the ranges, for in several different places the Biblical writers tell of the shepherds "taking their flocks to distant pastures" because of the lack of grass and water upon their usual grazing grounds.

Not only did these old graziers overstock their ranges but, like some of their modern successors, they also abused the land. The Prophet Ezekiel had occasion to find fault with them for the wasteful way in which they grazed pastures. Speaking to the shepherds of Israel, he says:

"Woe unto thee, shepherds' of Israel—seemeth it a small thing unto you to have eaten up the good pasture, but ye tread down with your feet the residue of your pastures."

Here was a public range being damaged by livestock over which even the governors of the country evidently had no control.

That these Palestine ranges supported an immense number of livestock is established by rather definite statements throughout the Old Testament. If the investigator is to accept these figures as correct, and there is no valid reason for doubting them, some of the individual holdings must have been extremely large.

For instance, at the celebration of the completion of the temple, King Solomon, according to the seventh chapter of second Chronicles, sacrificed no less than 22,000 oxen and 120,000 head of sheep. Also in second Kings, third chapter, we read, that—

"Mesha, King of Moab, was a sheepmaster and rendered unto the King of Israel an hundred thousand lambs and an hundred thousand rams with the wool."

There are several large sheep owners in our western range country, but not one of them could furnish at one time as many as 200,000 sheep from his flocks, as did this King of Palestine whose sheep ranges lay in the rough mountains near the Dead Sea.

When the sons of Ruben made war against the Hagarities, as part of their spoils of conquest, they—

"Took away their cattle; of their camels fifty thousand, and of their sheep two hundred and fifty thousand." (First Chronicles, 5–21.)

This was in the land of Gilead, somewhere east of the Jordan River. It must have been a very rich grazing ground with a large carrying capacity considering the comparatively small area of land embraced within the limits of Palestine.

Moses sent the children of Israel to war against the Midianites, and after the war they came home triumphant bringing with them among other things a tremendous booty in livestock.

"And the booty being the rest of the prey which the men of war had caught, was six hundred thousand and seventy thousand and five thousand

head of sheep and the beeves were thirty and six thousand, and the asses were thirty and five thousand." (Numbers, 32-31.)

Six hundred and seventy-five thousand head of sheep seems an almost impossible number to be taken as a booty in war and driven back to the home of the fighting army. That this once wonderfully productive range in Palestine suffered from this overgrazing is fairly well established by the general condition of the country, as reported by both early and modern writers, who have described its barren, arid plains and treeless mountains, caused undoubtedly by the lack of conservation in its use by the stockmen of early times.

For many centuries the occupation of a region, civilized or semicivilized, seems to have been followed almost invariably by damage to the ground cover. On this subject one well-known authority writes:

"There are good reasons to believe that the surface of the habitable earth in all the climates and regions which have been the abodes of dense and civilized population was with few exceptions already covered with a forest growth when it first became the home of man. * * * These evidences are strengthened by observations of the natural economy of our own time, for whenever a tract of country once inhabited and cultivated by man is abandoned by him and by domestic animals and surrendered to the undisturbed influences of spontaneous nature, its soil sooner or later clothes itself with herbaceous and arborescent plants and at no long interval with a dense forest growth. (Marsh, "The earth as modified by human action," p. 147.)

"I am convinced that forests would soon cover many parts of the Arabian and African deserts if man and domestic animals, especially the goat and the camel, were banished from them." (Ibid. p. 149.)

Marsh especially objected to the foregoing two animals because of their love for browse and their ability to break off and masticate the dry, thorny branches of the desert shrubs.

"Young trees sprout plentifully around the springs and along the winter watercourses of the desert," he continues; "in the shade of these trees annual grasses and perennial shrubs shoot up, but are mown down by the hungry cattle of the Bedouin as fast as they grow. A few years of undisturbed vegetation would suffice to cover such points with groves, and these would gradually extend themselves over soils where now scarcely any green thing except the bitter colocynth and the poisonous foxglove is ever seen." (Ibid.)

"The French traveler, Largeau, believes the Sahara to have been anciently well watered and well wooded, and to have been reduced to its present condition by the folly and improvidence of man." (La Pays de Rirha, Paris, 1879; Marsh, p. 150.)

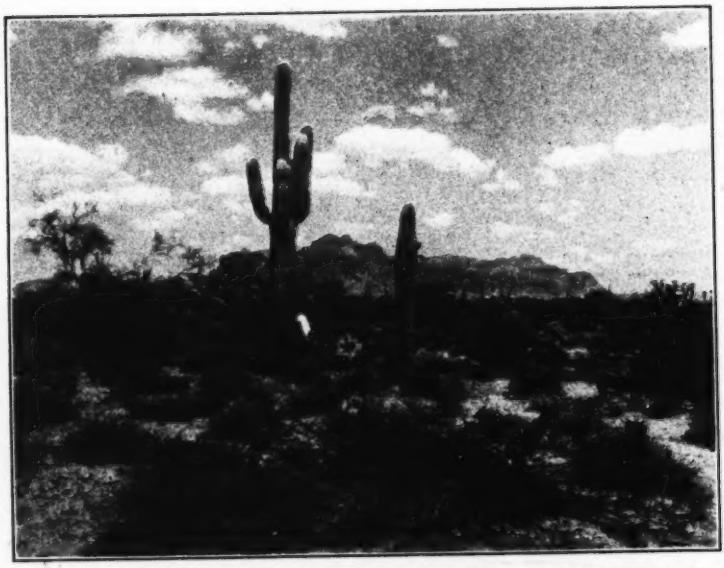
Marsh exonerates wild animals from this destructive process, believing that "so far as is known, it [their grazing habit] appears to be conservative rather than pernicious." (Ibid. p. 83.) He remarks further: "But while the wild animal does not appear to be a destructive agency in the garden of nature, his domestic congenors are eminently so." (Ibid. p. 84.)

This matter of the grazing habits of wild game has often been discussed in connection with the apparent absence of overgrazing on the western plains where the buffalo was found in huge herds by the earliest explorers. Those herds were said to be "uncountable," "innumerable," "inexhaustible," and their extinction deemed almost impossible. Undoubtedly the total number of buffalo on our western plains ran into many millions, but under civilized man's attacks they lasted not over 20 years and then were almost obliterated. The migratory habits of these as well as other grazing game animals in the period before civilized occupation of the plains tended to control and restrict their movements to and from their seasonal feeding grounds was in its character a fine example of what grazing experts of to-day designate as "deferred and rotation grazing." Each region was grazed in turn, slowly and thoroughly, and then left to rest and grow, to mature and deposit the seeds of the grasses, thus securing regular reproduction.

THE ORIGINAL FORAGE COVER OF THE GREAT PLAINS

It is fortunate that we have some rather full and satisfactory written records as to the nature and extent of the weeds and grasses that covered the Great Plains country used by the buffalo, of which considerable still remains as part of the public domain.

Early in 1540 Coronado, the Spanish captain, organized an expedition to explore the region to the north of the present Republic of Mexico. He



DESERT AREA IN SOUTHWESTERN ARIZONA OF VERY LOW CARRYING CAPACITY. RAINFALL SELDOM OVER 4 INCHES PER ANNUM

Forage principally mesquite browse and the beans. In some exceptional seasons with fall rains some short-lived annuals are found here which furnish some excellent feed for a few weeks

gathered his forces and supplies on the west coast of Mexico near Culiacan, from which point he left for the north on April 22, 1540, reaching the present pueblo of Zuni, in northern New Mexico, on July 7 of the same year. It took him some time to get his expedition ready for the march to the northeast in search of adventure and spoils, and it was not until April 23, 1541, that he set forth from near the present city of Las Vegas, N. Mex., marching steadily to the northeast across the great grassy plains of what is now eastern Colorado and western Kansas, following approximately the route of the old Santa Fe Trail. By the middle of August he and his army had marched as far to the east as the great bend of the Arkansas River in eastern-central Kansas. This route has been definitely located through references in the historian's story to some high bluffs on river banks along which the army marched for some days.

Within the past year or two near the town of Lundsborg in McPherson County, Kans., north of the Great Bend Excavations on a hill near the town were uncovered evidences of Spanish occupation of that spot, many buttons, coins, and other metal articles of Spanish origin having been unearthed. This makes it fairly certain that Coronado penetrated as far east as that point, which is about a hundred miles west of Topeka and about 75 miles north of Hutchinson, Kans. From here he turned and retraced his steps to New Mexico and thence down the Rio Grande to Mexico proper.

The story of this daring journey out into the midst of a vast unknown region is told in detail by Castenada, the historian of the expedition, who noted many matters which to-day are of great interest. Certainly one would never expect a soldier to take notice of the prolific growth of grass that covered the plains, but in this interesting narrative we read:

"Who could believe that 1,000 horses and 500 of our cows and more than 5,000 rams and ewes and more than 1,500 friendly Indians and servants in traveling over these plains would leave no more trace where they had passed than if nothing had been there—nothing—so that it was necessary to make piles of bones and cow dung now and then so that the rear guard could follow the army." (Castenada's narration "Relacion." Winship translation; 14th annual report, Bureau of Entomology.)

There must have been a tremendously heavy growth of grass to bring forth such comment as Castenada has here made.

Mr. Alexander Majors, the well-known western pioneer of the overland freighting firm of Russell, Majors & Waddell, wrote of this as follows:

"I have been grazing cattle on the plains and in the valleys and mountains for 20 years, and during that time have never had less than 500 head of work cattle, and for two winters, those of 1857 and 1858, I wintered 15,000 head of heavy work oxen on the plains each winter. My experience extends from El Paso, on the Rio Grande; to 100 miles north of Fort Benton, in Montana. Our stock is worked during the summer and comes to the winter herding ground thin. There it grazes without shelter, hay and grain being unknown. By spring the cattle are in good working order and many of them fat enough for beef. During these 20 years the firm with which I have been connected has wintered many cattle on hay and corn in Missouri and Arkansas, and I am sure the percentage of loss of those wintered in this country is less than it was in those States, with food and shelter. The country west of the Missouri River is one vast pasture, affording unequaled summer and winter grazing, where sheep, horses, and cattle can be raised with only the cost of herding." (Rept. U. S. Dept. of Agriculture, 1870, p. 303.)

In 1868 Gen. Luther P. Bradley, commanding certain United States Army posts in the Great Plains region, reported to the War Department on the character of the grazing on the plains as follows:

"The value of this country for grazing may be estimated from the fact that good, fine grasses grow evenly all over the country; that the air is so fine that the grasses cure all over the ground without losing any of their nutriment; and that the climate is so mild and genial that stock can range and feed all the winter and keep in excellent condition without artificial shelter or fodder. The fact of grasses curing on the ground is a well-known peculiarity of all the high country on the eastern slope of the mountains, and in this consists the great value of this immense range for grazing purposes. I believe that all the flocks and herds in the world could find ample pasturage on these unoccupied plains and the mountain slopes beyond; and the time is not far distant when the largest flocks and herds in the world will be found here, where the grass grows and ripens untouched from year to year." (Report, 1870, U. S. Dept. of Agriculture, p. 304.)

Is it at all surprising that with such reports and such conditions before them the pioneer stockmen who went into this region believed sincerely the range was so vast as to be impossible of overstocking? Certainly they may be forgiven for using such words to express its extent as "illimitable," "never ending," "boundless," "inexhaustible," etc. To them, with nothing in the past to guide them in their estimates, these great grassy plains seemed inexhaustible indeed. Yet within a comparatively short period of time these grazing and forage conditions had so changed as to attract the attention even in that early day of experts who noted the manner in which the forage plants were being ruined by unregulated grazing. They predicted that unless some strong and protecting arm could be placed about these lands they would eventually be completely devastated and their value as a great natural resource wholly lost.

Discussing this matter of overgrazing and injured ranges a report published in 1898[4] gives a very clear statement as to the character of the early grazing and the evils of overstocking that were already apparent on the wonderful prairies of the State of Texas. We read:

"A stockman who traveled with a herd of cattle through San Saba, Tom Green, and Taylor Counties in the summer of 1867, when that country was very sparsely settled, says that the grass was everywhere from 1 to 3 feet high, and that sometimes it was as high as a cow's back, not only on the bottom lands but also in places on the drier uplands. At that time there is little doubt that the range would have supported 300 head of cattle to the square mile. It was an ideal stock country.

"Now, at the end of 30 years (1898), almost every condition has changed. The carrying capacity of the range has steadily decreased until it is an exceptional property that can carry one head of stock to 5 acres. It is claimed that was the common average rate 10 years ago. To-day it requires at least 10 acres per head, and it is often considered not the best policy to put on more than 50 cows to the section of 640 acres.

"This overstocking of the ranges has continued year after year, through good seasons and bad ones, until it is the opinion of some of the most experienced cowmen of central Texas that the injury has gone almost past the point where redemption is possible. The ranges have been almost ruined, and if not renewed will soon be past all hope of permanent improvement.

"Not only have the ranges been overstocked, but the prairie dog and the jack rabbit have also been damaging the land until the best natural grass country in the United States has been almost destroyed. It is not yet too late to remedy the evil, but no time is to be lost."

THE OPEN RANGES OF TO-DAY—1925

At the present time it is estimated that about 586,000,000 acres, or nearly one-third of the total land area of the United States, is arid or semiarid, valuable only for range and pasturage purposes. Practically all of this lies in the far West. The 186,000,000 acres of this pasture land still owned by the Federal Government is known officially as "unappropriated and unreserved public lands." The remaining 400,000,000 acres are located mainly in the same region, but held under several different forms of ownership: Indian reservations, State lands, railroad land grants, Spanish land grants, unimproved in farms, and privately owned not in farms. There is also about 90,000,000 acres of this class of land included in the national forests, the greater part of which is used for grazing livestock.

It is this 186,000,000 acres of public domain, the remnant of our public estate, that have not as yet gone out of the hands of the Federal Government into private ownership, that constitute the public domain problem of to-day. It is still a national property, under no administration whatever, and as to its protection or preservation a veritable "no man's land." At the present time it is so badly overgrazed as to be more of a liability than an asset.

Twenty-five years ago, when there were nearly 300,000,000 acres of public domain not greatly injured by uncontrolled grazing, it offered one of the finest opportunities for constructive development work this country has known, one fully equal to that of the forests of the country. Since that time the more valuable portions of it have gone into private ownership through the operation

[4] Central Texas Ranges in 1898, U. S. Dept. of Agr., Farmers' Bull. No. 72.

of the Federal land laws and grants by Congress to States, until what is left is more or less scattered, divided up by private holdings, and in many instances lying in small isolated units not well adapted to Federal supervision.

Its 186,000,000 acres cover more area than Texas, the largest of our States, with 170,000,000 acres. It is slightly below the combined areas of California (113,000,000 acres) and Montana (90,000,000 acres), the second and third States in size. Certainly a large enough property to be given some thought and study as to its future use by its owners, the people of the United States.

If some other country proposed to donate to this Nation an area of almost any kind of land as large as Texas lying inside or even adjacent to our boundaries, it would surely be accepted without "looking the gift horse in the mouth." And yet this matter of the conservation and proper use of the public domain, although agitated for 30 or 40 years, has apparently been of little public or official concern.

Broadly speaking, it has little present economic use excepting perhaps to do its part in holding the rest of the country together. Its values have been destroyed by years of unrestricted grazing until its principal usefulness has almost been wiped out. It may well be called a shining example of our national trait of spoliation and destruction wherever our natural resources have been involved and stands to-day a monument to our lack of foresight and happy-go-lucky methods of managing these resources.

The situation is, however, not quite hopeless. Overgrazed lands can and have been restored to their full grazing values through methods that will allow the continued but reasonable use of the lands and at the same time restore the forage cover gradually but progressively.

The success of the Forest Service along these lines in handling overgrazed forest lands which lie close to or immediately adjacent to much of the present public domain speaks for itself. It is not now a question of can it be done, but merely a matter of does the country want it to be done; not a question of methods but one of action.

The proper plan of management of this remaining acreage of the public domain is the big problem which this bulletin is intended to cover.

Definition of Public Domain

"The public domain or public lands, the property of the Nation and subject to legislative control and disposition by Congress alone, is the area acquired by treaty, capture, cession by States, conquest, or purchase, lying in what is known as the land States and Territories."[8]

Character of Grazing Lands in the Public Domain

WASTE OR UNUSABLE LANDS

Of the 186,000,000 acres included in the general name "public domain" a large acreage may well be dropped from grazing consideration owing to its desert character.

Briefly, there are included in it three great arid wastes upon which little or no forage of any kind now grows, excepting in southwestern Arizona, where the annual crop of mesquite beans furnishes considerable nutritious feed for livestock of all kinds during several weeks in some years but not in every year. Other forage is, however, so extremely limited that these mesquite areas can not be used to any extent for general grazing purposes.

The first of these waste areas is known as the Salt Lake Desert, which is a vast saline-alkaline area west of the Salt Lake, mostly in Utah, a small part in Nevada, the ground for the greater part being absolutely bare of all forage growth.

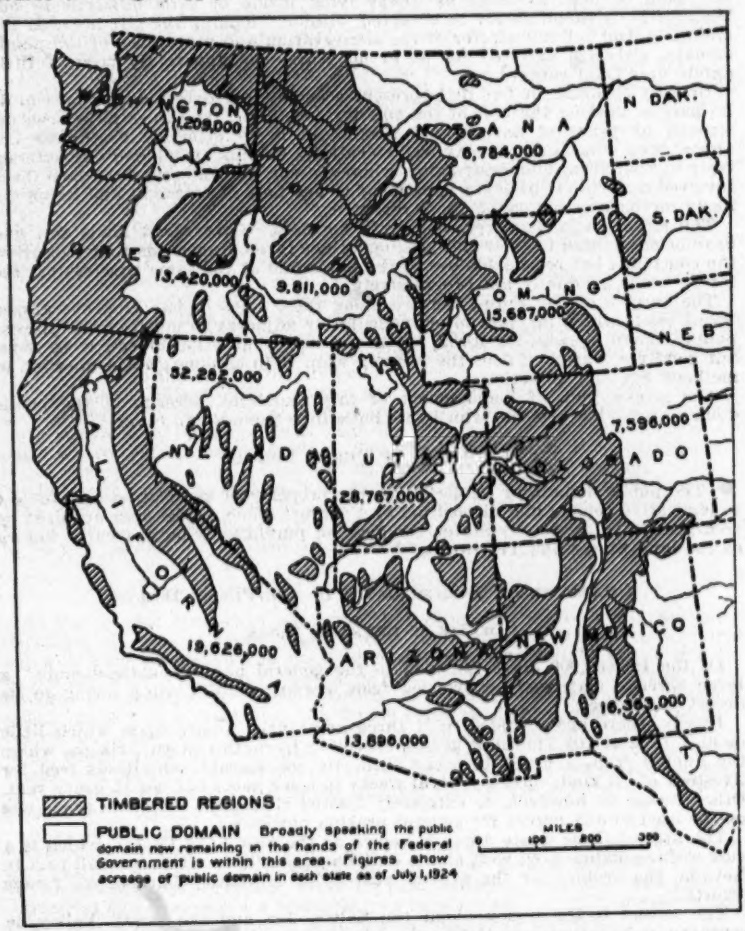
The second is the region about the Salton Sea and the Death Valley, in southern and southeastern California, where vegetation is so extremely limited excepting on a few comparatively small oases as to make its use for grazing animals entirely out of the question.

The third lies in southwestern Arizona east of Yuma and west of the Gila and Salt River meridian, extending from the Mexican boundary on the south to about 50 miles north of the line of the Southern Pacific Railroad. Some scattered forage plants are found here on small areas but not widely enough

[8] The Public Domain and Statistics, published by the U. S. Government, 1883, pt. 1.

distributed to make regular grazing possible. Here the mesquite trees furnish some grazing at certain periods of the year, and occasionally with an unusually fine rainy season in the late fall the desert has a fine growth of annual weeds and grasses which could be used by livestock if they could reach it in time.

Areas such as these three on which the average annual rainfall is only about 4 inches should be left out of consideration in any studies for the utilization of the public domain ranges, as they can not be depended upon as a source of forage supply. Including these areas and similar bodies of land



in smaller units elsewhere, it is safe to figure that approximately 10 per cent of all the public lands now remaining in Federal ownership should be deducted from the total and not taken into consideration as of any grazing value whatever.

GRAZING LANDS

This leaves about 160,000,000 acres of public domain range which may reasonably be considered a national grazing resource to be used under some form of range management that is suited to the character of the forage and

A BIT OF THE RED DESERT RANGE IN WESTERN WYOMING

the supply of stock water either available now or to be furnished through artificial methods. These will be earth reservoirs of large capacity to catch and impound flood waters, supplemented by wells wherever well water can be obtained without too great expense.

On part of these lands the carrying capacity is so low and the acreage required to carry one cow so large (50 to 60 acres) that unusually high costs for water development can not possibly be considered until such time as the mounting prices of meat may justify the expenditure.

SPRING RANGES

Of the 160,000,000 acres suitable for grazing, about 15 or 20 per cent is spring range; the remainder is winter range and should be used only during that part of the year. Here and there are comparatively small areas on which the forage plants are rather short lived and must be grazed if at all for a short season in the early spring months.

A typical area of this kind is the great desert range in the Salt River Valley of Arizona. If the fall and winter rains are fairly normal in this desert, which for nine months of the year is almost barren of all forage growth, except the mesquite trees and creosote brush, becomes one of the most wonderful grazing areas known in the West. By the middle of February the alfilaria (*Erodium cicutarium*) turns the whole desert into a field of brilliant green until the range looks like a vast field of alfalfa. Its carrying capacity is very high and the forage growth is so rapid that, although it is heavily stocked by both sheep and cattle, very little impression is made on the feed. For putting a finish and "bloom" on range lambs it has no rival. This feed seldom lasts more than two months at the outside. When the change comes, the pink blossoms of the plant fade, its leaves turn brown, and the whole plant dries out; the winds break it off at the ground; it blows into high windrows, piles up against bushes, or drifts with the wind into the deep arroyos and fills them to the top with a dead and now useless vegetation.

With the alfilaria is associated a fine forage weed geranium (*G. viscosissimum*), also several short-lived grasses, poverty grass (*Aristida reverchoni*), bronco grass (*Bromus rubens*), and several other awned grasses, which if grazed when young and tender furnish very good spring feed, but which when full grown are very objectionable forage plants because of the dry awns that work into the lips, eyes, and even the bodies of the stock.

In almost every part of the western range States there are some of these early spring ranges which lie at intermediate elevations, below the high mountain ranges, and above the lower valleys. The feed upon them must be utilized in a comparatively short period or they lose their freshness and forage values. As a rule these early ranges make admirable lambing grounds for stockmen, and large acreages have been acquired under the land laws or else purchased from the States by the sheepmen for such uses. In this way the major portion of the spring ranges have passed out of the hands of the Federal Government into private ownership.

The foothill region along the western slope of the Sierras from Lake Tahoe south to the edge of the Mojave Desert is an outstanding piece of spring range of high value to the farmers and stockmen located in the San Joaquin and other valleys west of this range.

Generally speaking, throughout the western range States the majority of these spring ranges have withstood the ravages of unregulated use without the injury or deterioration that has followed grazing on other areas of the public domain. In fact in a large number of instances they may be said to have been somewhat improved—a rather interesting consequence. The reason, of course, is fairly obvious. The season during which the ranges can be used is very short, because the plants on them spring up and mature very rapidly. If not grazed while young and tender, they dry out and become unpalatable, and the stockman is compelled by force of circumstances to move on and seek fresher range. This drying-out process allows the seed to mature, and thus the plant is reproduced year after year, even under heavy grazing.

It is rather interesting to know that nearly all the important forage plants on these spring ranges are not native but are strangers in our land, immigrants from foreign countries. On the foothill and semidesert ranges in California along the western slope of the Sierras, in the great San Joaquin Valley, and in other areas especially in the Southwest, the foxtail (*Hordeum* spp.), bronco grass (*Bromus rubens*), poverty grass (*Aristida* spp.), and the wonderful alfilaria (*Erodium* spp.) or "filaree," are all importations into this country.

In southern Utah an annual locally known as June grass (*Bromus tectorum*) more properly downy brome, has come in on the rough foothill ranges along the western slope of the Wasatch Mountains within the memory of comparatively young men. In all these regions these plants undoubtedly have been brought into the ranges they now occupy by means of seeds buried in the wool of trailing sheep and scattered wherever they grazed. Through such means they have been distributed over the entire West wherever their needs were met as to soil, moisture, etc. The spread of alfilaria from the Pacific coast all over the West, even into some high altitudes of the Rockies, and out on the plains of eastern Oregon, is a study in itself. In 1915 the writer found this plant growing along a railroad siding in the Palouse Valley of southeastern Washington. A little investigation showed its origin through the unloading for feed and rest of a train load of sheep from southern California a few years before.

Undoubtedly all of these introduced species came into the far West by way of sheep imported through the Golden Gate from South America (the alfilaria came from Chile), Australia, and European countries, for in the early years millions of sheep were trailed from Californian ranges over the Sierras and Cascades into adjoining States. The trailing of sheep from the eastern coast of Mexico up into Arizona and New Mexico undoubtedly spread certain seeds over that region. This began as early as 1541, when Coronado's army brought with them into these States cattle and sheep on foot for feeding the soldiers. The Jesuit priests who followed the conquistadores in later years also brought many sheep with them from Mexico.

June grass in Utah grows so luxuriantly as to make it considerable of a fire hazard on those ranges adjacent to and often inside the boundaries of national forests, so that keeping it grazed down becomes a problem for the forester as well as the grazing expert.

These spring ranges start very early in the year, reach maturity in a comparatively short time, and generally speaking, by the end of June are dry and yellow and have lost their value as a grazing resource for that season.

WINTER RANGES

As heretofore stated the major portion of the grazing lands on the existing public domain should be classed as winter range, or range to be grazed only during the winter. These lands are broadly what is defined throughout the West as "sagebrush lands," the predominant vegetation being the several varieties of sage (*Artemisia* spp.), shadscale (*A. canescens*), common sage (*A. tridentata*), bud brush (*A. spinescens*), and such browse plants, together with considerable numbers of grasslike plants and weeds.

In the early days these semidesert ranges were not considered so valuable to the stockmen as were the summer ranges in the foothills and mountains. This was doubtless because there was practically an unlimited amount of desert range available to everyone who desired to use it. The homesteader had not as yet invaded the desert country, and when the stock came from the summer ranges, fat and well grown, the owners could drift out into the vast unoccupied winter ranges lying open to them and find them ready for their coming.

To-day this has all been changed. Limited as is the summer range, nevertheless the winter ranges as a savings bank upon which local livestock men may draw during the long winter season have been greatly reduced, first because of settlement, and next and more far-reaching because of the abuse they have received at the hands of the stockmen using them. Lacking public winter range for his stock the owner must now provide either private pastures or hay and other artificial feed. This is far more expensive than handling the animals upon open pasture lands, where they can take care of themselves with comparatively small labor cost. Therefore, as a general rule, the winter ranges of to-day have high value to the stockmen of the range regions. Here and there, as part of the public domain, will be found some lands suitable for early spring use as outlined on page 1595, and in some instances for summer use; but as a general thing the remaining public domain pasture lands are most valuable for winter use in the production of livestock in the range regions and should be considered and managed along such lines.

In order to study these winter ranges in detail it seems advisable to select from the whole public domain a few outstanding areas where the present use is heavy, the demand strong, and the grazing conditions really serious. Taking a wide view of the range region generally one can locate well-defined outstand-

ing bodies of land on the public domain that will be fairly representative of the region in which they lie. These are the "Red Desert" region, in southern Wyoming; the so-called "West Desert," in western Utah and eastern Nevada; the Owyhee Desert, in southern Idaho and southeastern Oregon; and the desert ranges of southern Nevada. These four areas are comparable in every way with the rest of the public lands around them and are typical as to forage, watering places, either natural or artificially provided, period of use, and class of stock which can most satisfactorily and economically use them.

In addition to these are the "Ralston Desert," in southern Nevada, the sagebrush range lying along the Rio Grande in northern New Mexico and running as far north as the little hamlet of Antonito, Colo., and an area in southeastern Oregon. Each is of large acreage and of approximately the same character as to forage cover, watering places, seasonal use, and lack of value for any other use than the grazing of livestock, like the rest of the public domain in their vicinity.

The Red Desert Region

LOCATION AND FORAGE COVER

According to Dr. Aven Nelson,[6] "the area originally designated by the name 'Red Desert' is but a small part of what is now considered as within its boundaries. (See map, p. 1598.) The name first applied to a tract possibly less than 15 or 20 miles in extent characterized by the peculiar red-clay soil of the Wasatch Eocene formation. The larger Red Desert as now understood includes, however, all that arid section of salt impregnated soil in southern Wyoming in which the salt sages predominate."

It lies astride the Continental Divide, above 6,000 feet, the railroad station at Creston being the highest point, 7,038 feet. The rainfall is light. The winter snows furnish the greater part of the stock water and the moisture necessary for the scant vegetation, which fortunately, being a product of the soil of the region, is able to function and reproduce under such arid conditions.

Broadly speaking, Doctor Nelson found the region covered an area about 85 to 130 miles in extent, or approximately 7,000,000 acres. The vegetation consists mainly of the common sage (*A. tridentata*), bud brush—bud sage—(*A. spinescens*), salt sage (*A. nuttallii*), winter fat (*A. lanata*), and shadscale (*A. confertifolia*).

Along certain "wet weather" watercourses are some of the willows (*Salix* spp.), rabbit brush (*Chrysothamnus*), chokecherry, mountain mahogany (*Cercocarpus*), greasewood (*Sarcobatus*), etc., while scattered through the brushy feed are several varieties of the western wheat grasses (*Agropyron* spp.), salt grasses (*Sporobolus airoides*), and such plants. In certain parts the hills carry small bodies of juniper and cedar trees.

When Doctor Nelson explored the region in 1897 the range was in excellent condition, and, according to the stockmen interviewed, was actually improving. He estimated the number of sheep and cattle grazing on the area for the winter season of five months beginning about November 1 at from 300,000 to 500,000 for the winter of 1896–97. He obtained figures from some local stock owners showing that probably 800,000 sheep used the area during that winter, 1896–97.

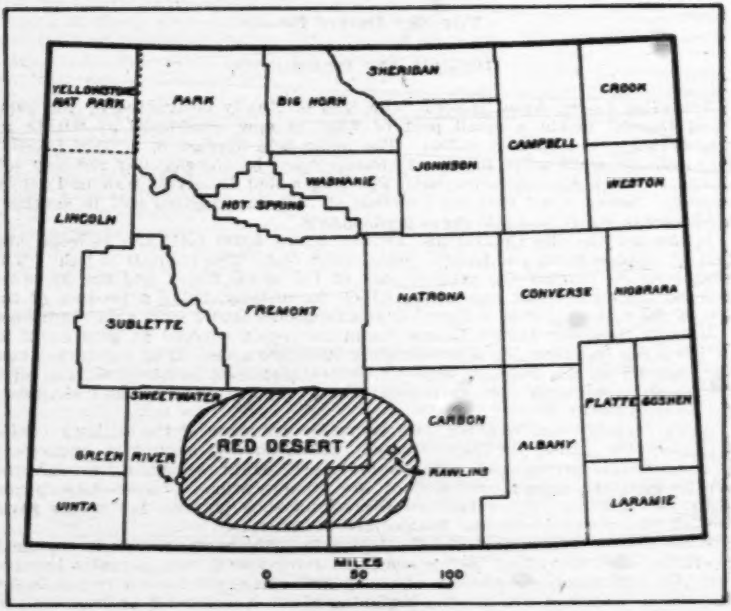
Surrounded on all sides by timber-covered mountain ranges upon which the sheep graze during the summer months, this Red Desert region is naturally in great demand for winter grazing. On leaving their summer ranges the sheep drift slowly out of the foothill country, reaching the real desert during November and leaving it early in April. The rolling broken nature of the desert furnishes ample shelter from blizzards and drifting snows, although in some years during periods of long snowstorms unaccompanied by high winds to blow the snow from the hillsides and give the animals an opportunity to find some feed, the sheepmen have suffered heavy losses. In later years this has been partly overcome by providing at certain points on the range supplies of concentrated feed such as corn chop, cottonseed cake, and in many instances baled hay. This feed is located during the fall at strategic points so

[6] The Red Desert of Wyoming: Its Forage Resources; Aven Nelson, U. S. Dept. of Agriculture, Div. of Agrostology Bulletin No. 13.

as to be available if the need arises. If it is not used it has well served its purpose as an insurance against loss and can be held over for future needs.

An interesting matter is Doctor Nelson's statement to the effect that at the time he was there the stockmen felt that the range was improving even with the heavy demands upon it, year by year. This they explained was due to the profuse fertilization the ground was receiving through the animal droppings, an idea that prevailed all over the far western range region in those early days. As a matter of fact in practice continued use of the range has proved this theory unsound.

The Red Desert range lies mostly within the boundaries of the land grant belonging to the Union Pacific Railroad which passes through it on an east and west line. Sheepmen using the area realized very early in the beginning of their range industry that it would pay them to secure control of the alternate railroad sections which would also give them more or less of a control of the intermingled Government lands.



WYOMING

Several livestock cooperative associations entered into agreements with the railroad company for leasing the lands, the leases being granted to the association in solid tracts and then allotted to the several members, based upon the number of sheep they represented in the organization. In this manner they have been able greatly to reduce the number of outside sheep using the area, although decisions of Federal courts prevented the lessees from securing absolute control of all the land, railroad, and Government. The courts decided that ingress and egress to the intermingled Government lands could not be denied to any person provided the herds moved with reasonable promptness and no unnecessary damage was done to the private lands crossed.

This naturally opened the region to the nomadic sheep owner, who under pretext of using the Government lands intermingled with the railroad lands grazed across them back and forth about as he pleased, handling his sheep in such a manner as to make it difficult to maintain trespass proceedings against him under State laws.

Moreover, the men who were leasing and paying for the use of the railroad sections failed utterly to grasp the fact that even with the tramp sheep elimi-

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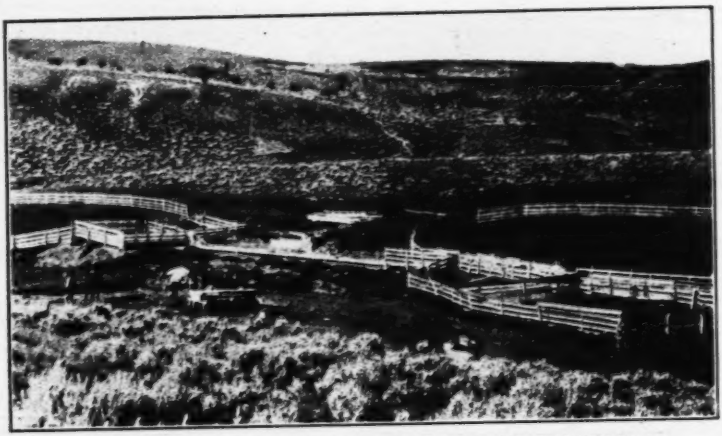
TYPICAL WESTERN SAGEBRUSH RANGE, IDEAL FOR WINTERING SHEEP



SHEEP-DIPPING VAT AND CORRALS ON THE PUBLIC DOMAIN

The stockmen can seldom secure title to the necessary land on which to erect such improvements upon the public domain

640-ACRE GRAZING HOMESTEAD IN UTAH. WATER EXTREMELY SCARCE; RANGE MIXED GRAMA GRASS AND SAGE; 250 MILES TO NEAREST RAILROAD POINT

A wonderful winter sheep range utterly ruined by overgrazing

nated they were still grazing the land far too heavily, and that its value as a grazing resource was growing less and less with each succeeding year. In spite of their experience during previous winters, they continued to descend upon it every fall and remain on it until able to leave it for the higher ranges in the spring.

Naturally the deterioration has been heavy. Most of the old-time forage plants and browse have been killed out by the hungry sheep, or at least so severely pruned by their sharp teeth that the vitality of the plants has been greatly reduced, and each spring their early growth is less and less. An examination of several parts of the Red Desert ranges several years ago showed plainly the steady deterioration of all the browse plants. Here and there one found seemingly fine areas of brush, but invariably they were the unpalatable or seldom-eaten species of sage which had outlived the other members of their family simply because they were not relished by livestock of any kind.

But the valuable forage plants were scarce. Shadscale, winter fat, and bud brush, three of the most palatable and nutritious browses, showed the effects of heavy grazing. In many large areas the bud sage was absolutely eliminated and was not to be found at all. The same thing had happened to the other forage plants. The few grasses that once were found in fairly strong stands had been severely grazed, and except here and there where small areas had been fenced and the stock kept out they were exceedingly scarce. The willows, mahogany, rabbit brush, and browse of that kind furnished not one-third the feed they did 25 or 30 years ago. And yet these areas are still carrying about the same number of sheep as they did in the years when Doctor Nelson first visited them and the stockmen assured him they were really improving under grazing use.

In those days every band left the Red Desert in the early spring in first-class condition. The lambs born there were strong, husky little fellows, while the ewes were nearly always in good shape. To-day the area is used very little for lambing simply because the early spring feed is not to be found any more. The browse is too tough and tasteless to furnish milk for the ewes, while the lambs' mouths are often so sore from the harsh feed that they can scarcely graze.

A general survey of the situation on this Red Desert range shows pretty conclusively that while at the present it may be carrying about the same number of sheep it did 20 years or more ago they are not being carried in the sense the word is generally used. True they do graze, but the scant feed they get is lengthened out by artificial feeding during hard storms, while the condition in which the animals are when they leave the desert each spring is so bad and the losses during the winter have been so heavy as to make the cost of the feed unusually high. Many sheepmen have told the writer that the majority of the sheepmen using the Red Desert winter ranges would be far better off if it could be closed up absolutely and the owners of the sheep forced to provide feed on their farms. They felt sure the cost of the feed would not be as great a financial burden as are the losses in lambs, flesh, wool, etc. Many progressive sheepmen are now lambing on their home ranches where the ewes can be fed hay, with sheds for shelter against the winter storms.

In the early days, with plenty of feed on the ground, under average conditions no one worried about the weather. Occasionally a band was caught under the lee of the walls of some deep "wash" into which the herder had pushed them for shelter. The drifting snow poured over the edge onto them until the band was covered deep with a snowy blanket. If this lasted too long or a crust formed over them they smothered. Sometimes whole bands were lost in this manner and were not found until the snow melted and exposed the bodies where they had huddled together for warmth. As a general thing, however, such losses were rare, and wintering sheep on the Red Desert was considered a very safe proposition. The conditions have changed very materially and a fair estimate of the present grazing value of this range for winter grazing of sheep would be very low.

On the basis of the condition of the range at the time Doctor Nelson visited and studied it in 1896 it is probably safe to state that in its present condition, with the palatable forage plants practically gone and only the unpalatable ones left, it should not be stocked with more than one-half the number it was carrying at that time. But unless some central-established authority is given power to enforce these reductions, keep the stock off the range during the summer, and give the old plants a chance to come back, matters will simply keep on

going from bad to worse, the losses will grow heavier, and eventually the whole area will have to be absolutely abandoned as a grazing region.

The "West Desert"

In the early days of the range industry in the Great Basin region, which runs back to the early sixties, the pioneer stockmen of Utah, Idaho, and Nevada found a wonderful winter range in the desert country west and southwest of the Great Salt Lake. About two-thirds of it lay in western Utah and the rest in adjoining eastern Nevada. It was a region of scant rainfall, and contained few running streams, springs, or fresh-water lakes. The snowfall, however, was rather heavy and furnished an ample water supply as it melted and was held in reservoirs or as the snow banks, which generally lay for several months, provided fairly dependable watering places. As far back as 1870 the Utah pioneers began to use the area, the flockmasters finding it especially satisfactory for winter sheep grazing and early spring lambing purposes. Some areas of it were used for cattle, but it was largely too far from the farming areas to be utilized with profit for that class of stock.

As the foothill ranges along the western slope of the Wasatch Range, which divides the State of Utah on a north-and-south line, became crowded the owners pushed their flocks farther and farther to the west, finding in those vast rolling desert areas almost ideal conditions for winter sheep grazing. Best of all, there was apparently room for everybody and to spare; to them it seemed absolutely limitless, and the sheep industry of that region prospered amazingly. The fame of this desert range spread. Fellow sheepmen of southeastern Idaho looked it over and liked it so much they trailed their flocks down onto it. Later on, as the sheep industry of Nevada expanded, the sheepmen of that State drifted onto it from their summer ranges in the mountains to the west and north. Thus it came about that by 1895 this west desert range was carrying nearly 500,000 range sheep during the winter nongrowing season, which averaged about five months.

It is estimated that approximately 10,000,000 acres of the West Desert lies in Utah and 6,000,000 acres in Nevada, a total area of about 16,000,000 acres, or a little less than the combined area of New Hampshire, Vermont, and Massachusetts. On a carrying capacity basis this area has been averaging one sheep to every 20 acres, which would probably have been sufficient to prevent damage to the forage upon it could some control have been exercised over the stock as to numbers, periods of use, methods of handling, and distribution, together with some reasonable and necessary water development.

This, however, could not be done, and the usual results have followed. The range has steadily deteriorated in quality and quantity, losses from various causes have increased, the percentage of lambs marked up has grown less and less each season, the number of sheep has increased steadily and for several years past the sheep have been leaving these winter ranges each spring in extremely poor condition.

The losses in aged sheep as well as in young lambs have become so serious within the last few years that Government officials have been appealed to to make investigation as to the causes. The majority of the losses the stockmen seem to believe sincerely are caused by poisonous plants of some new and unknown kind. Investigators skilled in the knowledge of such plants, however, disproved this theory. The veterinarians who have studied the situation are convinced that the losses are due almost wholly to the lack of palatable nutritious forage. It should be understood that to the average observer there is still plenty of sage and other browse on this range. A careful investigator, however, soon discovers that while there is a fair amount of forage on the ground it is a class of feed that is not only unpalatable to stock but has absolutely no nutritive value. It has evidently been a clear case of the "survival of the unfittest" among the various plants, browse, etc. Those that are sought after by the sheep have naturally been eaten first and the less palatable varieties only when the others have been so reduced in volume as to force the hungry animals to graze upon them or starve. The instant any of the forage plants liked by sheep showed signed of fresh growth a hungry sheep was after it. Eventually only the toughest and most unpalatable plants survived, and through this process the palatable species have about been exterminated.

The investigations of the veterinarians into the feed content of a large number of sheep stomachs taken from animals either dead or killed when so weak that it was but a question of hours until they died showed conclusively they had been forced to "fill up" on forage consisting mainly of ends of limbs, twigs, bark, and dry, tough leaves which are absolutely indigestible. In many cases the stomachs showed signs of damage through the cutting or scarifying effect of such material on the lining of the stomach. Of poisonous plants they found little or no sign, and it has been the unanimous judgment of these investigators that the increase in losses which has been so pronounced during the past 10 years is due wholly to the overgrazed condition of the forage plants on the desert. In other words, it is just plain starvation, nothing else; and yet many of the sheepmen can not be brought to see that the continued use of this west desert winter range will only bring them additional losses and extend the process of plant extermination. They have built up their range business on the basis of using this range every winter and have made very little provision for handling their flocks under any other conditions.

An added cause for this recent increase in losses has been the use of the area during the summer months, so that at the present time portions are in almost constant use from one year's end to the other. Many of the sheep occupying the range in this way, especially in northern Nevada, belong to alien operators who own very little in the way of ranch property and are range nomads in the full sense of the word. Unable to secure permits on the national forests during the summer season, because of their not being citizens or because of their possessing no range property, they have turned to the desert as the only place where they could find free cheap feed. In the majority of cases these alien sheep simply roam about over the desert range heedless of season, condition of green feed, or anything else. Their owners practice no system of management intended to promote or protect the growth of the forage, respect nobody's "rights" as understood under the unwritten law of the ranges, and move their herds from one place to another how, when, and as they please. As a general thing it is believed they wear out about as much range trailing back and forth to permanent bed grounds and seeking fresh feed as they utilize in grazing. Few of them own a foot of land outside of a home in some town, where they maintain their families; and as to water development or other range improvement they know nothing of such things. Their great sheep wagons, with a few pack mules and camping outfits, are about their entire investment in equipment. Wherever night overtakes the herd, there is range headquarters.

It is these nomadic alien herds that have done so much to make the desert ranges really deserts in the fullest sense of the word. There is no law, either State or Federal, that will meet the situation. The land is open to all comers, regardless of citizenship, race, or other qualification. They know this and endeavor to get what they can out of it while the present situation lasts, regardless of the damage done to the range or its future value.

As this region lies at a somewhat lower altitude than the Red Desert country of Wyoming, the winters here are much less severe, the snows not so deep, and the spring comes earlier. In the early days this West Desert region supported an unusually fine ground cover of all the valuable sages and wheat grasses that are found on similar semidesert areas in the Northwest. It was undoubtedly one of the most wonderful sheep-grazing areas in the entire West.

In addition to the palatable sages and wheat grasses there were many other fine forage plants which grew in great profusion. During the summer months these grew up rank and strong. Untouched by any grazing animals excepting a few antelope, in the fall it was a vast area of excellent feed, cured on the ground, and ready for harvesting by the sheep.

In the beginning every sheepman recognized the rights of his neighbor to a certain part of the area; they respected each other's range rights as fully as if there existed a legal, recorded title to the range. Shearing and dipping plants were safe from damage. Corrals, pens, and sheds were left all summer long without any thought of their being injured by anyone. As the crowding began and the nomadic herds commenced to drift onto the area each year earlier and earlier in the fall, these so-called range rights were not respected by the newcomers. There was no law to reach them, and it soon began to be a case of first come first served.

One of the earliest users of this range, a Utah sheepman of many years experience, several years ago told the writer that: "Up to very recent years, when we went to the West Desert in the fall we each drifted our sheep to that

part of the area we had used in previous years, confident we would find everything just as we left it in the spring, our old camping places, corrals, etc. safe, and the feed, untouched during the long summer season, sufficient for our needs. Winter losses were low, and in the spring our sheep started back to the mountains fat and strong. We all respected each other's rights in those days."

"Now," he continued, "we find our range rights disputed by a lot of alien transients, who, in some instances, have taken full possession of our improvements and laugh at our demands for possession. Where these usurpers are not on the ground it is because they have already been there with their sheep during the summer, and have gone, leaving the range swept clean of everything in the way of feed. When we went to the United States authorities they told us we could not help ourselves; that there is no law to put a stop to such practices or control the grazing use of the area. Our winter losses are now becoming a serious matter. In the spring our sheep are poor and weak."

One could not help sympathizing with these old-timers. Nevertheless, when they had a chance to secure the passage of a Federal law that would control these areas and stop such reckless use of the public property they opposed it almost to a man.

This reckless competition could not, of course, continue without the damaging effects becoming more and more manifest. The winter fat (*Eurotia lanata*), bud sage (*Artemisia spinescens*), two of the most important of the valuable forage plants, soon became scarce. The wheat grasses (*Agropyron* spp.) of several kinds, balsam root, lupines, sunflowers, mustards, Indian paintbrush, wild carrot, buckwheat, and numerous other palatable perennial weeds have become extremely rare under this wholesale use of the west desert area.

A recent investigator for the United States Department of Agriculture, studying the conditions on this West Desert range, made the following statement, in part, as to what he found:

"As the quantity of the forage grown on the range decreases the quality decreases also. If this is true, and it very likely is, it will account for the increased death loss of sheep on the Nevada ranges, and for the, generally speaking, poorer condition of the surviving sheep that return from the winter range. I have been unable to notice where any species of plants have disappeared from the winter range, and, as you know, most of the winter feed is browse, but I can notice that all the different kinds of sagebrush, and similar growth, are making a poorer growth from one decade to the next. I take it that the sheep on the winter range in this State get just as many pounds of feed per day, and of the same species of plants, as they did 15 or 20 years ago, but the nutriments are not there, due to the diminishing quantity of forage grown by each plant, hence a diminished quality of forage eaten by the sheep."

These statements as to his inability to "notice where any species of plants have disappeared from the winter ranges" are extremely interesting, because not exactly in accordance with the observations of others, and seem to call for some further study of this point before it may be accepted as absolutely correct.

In the year 1923 it was estimated that over 1,000,000 sheep used this West Desert range for approximately five months and a half, coming from the following States:

Utah	500,000
Southern and southeastern Idaho	400,000
Nevada	200,000

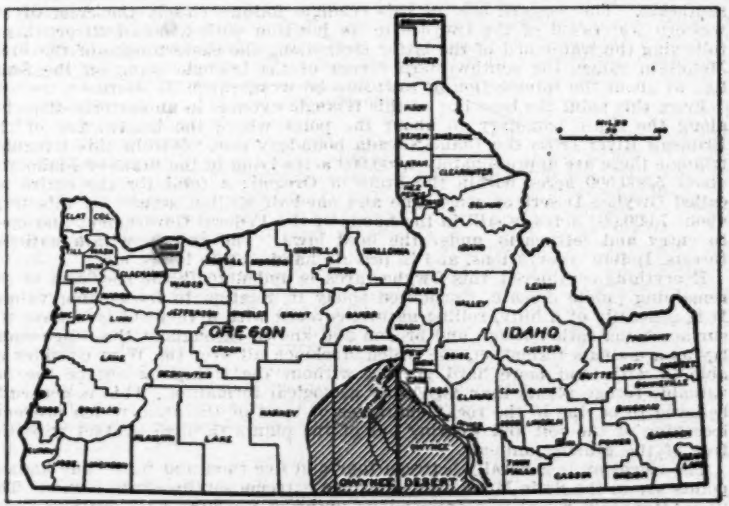
Many of the Nevada sheep and some from Idaho used it the full year.

In the early days the Utah sheep were trailed back and forth to this winter range, the intervening country being unoccupied and the sheep finding feed in plenty the greater part of the way. Trailing to-day is wholly out of the question. Miles and miles of fenced lands make driving a very difficult operation; feed must be purchased and provided nearly every night; the moving animals break through fences and damage growing crops, for which the sheepmen must pay full value, often more than the full value of the crop destroyed; and as a result of the crowding and forcing process which must be used in handling a band of sheep under such conditions the animals arrive at the desert in much poorer condition than when they left the summer ranges. In the spring the drive back is even more serious because of the lambs, which suffer greatly from such usage. This situation has forced many Utah sheep owners to ship their sheep to and from the desert by rail. The cost averages about 15 cents per sheep for the round trip. Some of the

Idaho sheep have also been shipped in during recent years, but as a rule the major portion of the herds from that State can be trailed to the desert edge without much trouble. This is also true of the Nevada herds.

Just how much longer the sheepmen will continue to use this winter range and face the losses they do is difficult to forecast. Most of the sheep owners interviewed declare they must use it or sell out and quit the sheep business. Using the desert range they feel that even with losses they can make money. It is evident, however, that its condition is growing worse rapidly and that the time is not far distant when the most conservative owners will give it up in despair. They must either get out of the business or else run less sheep and provide winter feed for them in the way of haystacks or private winter pastures that can be held for such use.

Unlike the Red Desert range, this West Desert region lies wholly outside of the railroad grant lands, while the amount that has passed into private ownership through the operations of the various Federal land laws is so



OREGON AND IDAHO

small as to offer no complications as to ownership or management. As a winter range it is of wonderful value to the livestock interests of the nearby States. It is however to-day more of a liability than an asset, an unfortunate condition which should certainly not be allowed to continue.

The Owyhee and Adjoining Desert Ranges

The name Owyhee is applied generally to a large area of semidesert country lying in the extreme southwestern corner of Idaho and the southeastern corner of the adjacent State of Oregon. The major portion of it lies in Owyhee County, Idaho, and Malheur County, Oreg. It is bounded on the east by the Snake and Bruneau Rivers in Idaho, and the crest of the western watershed of the Owyhee and Crooked Rivers in Oregon. If we consider with this Owyhee country the equally large areas of the same kind of range lying adjacent to it in Lake and Harney Counties, Oreg., often called the Oregon Desert, but somewhat divided from the Owyhee Desert by the Stein Mountains and the Malheur Rivers on the west so as to form a separate unit, and also an area of several million acres of almost the same class of range, but with a much smaller carrying capacity, lying immediately adjacent to it on the south in the northwestern corner of Nevada, we shall have what is undoubtedly the largest almost solid body of public domain semidesert graz-

ing land still in the hands of the Federal Government, the total area of the entire region being nearly 25,000,000 acres. It is not inside of any land grant area, and a comparatively small part of the surface has found its way into private hands. There is, of course, a much larger area of public domain in the State of Nevada, but it is practically all to be classified as desert range in the full sense of the word.

For the purposes of this discussion only the Owyhee area will be considered, the conditions on the adjacent ranges as to forage, general use, and present conditions being similar. The Owyhee range is more generally used by sheep, few cattle being grazed upon it. On the so-called Oregon Desert, however, both cattle and sheep have used the range in large numbers for many years past. Shep alone use the Nevada section.

Broadly speaking, the Owyhee area may be roughly described as a huge equilateral triangle, the upper point of which is located on the boundary line between Oregon and Idaho a few miles north of the point where the Owyhee River flowing from the southwest joins the Snake River flowing from the southeast. The western side of this triangle follows closely the crest of the western watershed of the Owyhee to its junction with Crooked River, thence following the watershed of the latter river along the eastern edge of the Stein Mountain range, the southwestern corner of the triangle being on the State line at about the intersection of township 36 west, range 41 south.

From this point the base line of this triangle extends in an easterly direction along the State boundary to about the point where the headwaters of the Bruneau River cross the Idaho-Nevada boundary line. Within this irregular triangle there are approximately 4,000,000 acres lying in the State of Idaho and about 5,500,000 acres within the State of Oregon; a total for the entire so-called Owyhee Desert of some nine and one-half million acres. Of this total about 7,000,000 acres is still in the hands of the Federal Government and open to entry and settlement under the land laws. The rest is within national forests, Indian reservations, and in private hands, State lands, etc.

Everything considered, this Owyhee area is undoubtedly the best part of the remaining public domain, considered solely in relation to its grazing values. It is generally of a hilly, rolling nature, covered with a very old lava flow, the surface being rather rough and broken and known throughout the range country as a malpais formation, one which stockmen all over the West consider as able to withstand more hard grazing without the trampling out of the old valuable forage plants than any other geological formation. This is generally believed to be due to the rocky character of most of the area, which prevents loosening of the soil and wearing out of the plants through contact with the feet of the grazing animals.

The elevation is generally between four and five thousand feet. The highest points are in the Stein Mountains along the extreme southwestern corner. The Stein Mountain range is a tremendous upthrust reaching an elevation of between nine and ten thousand feet above sea level, with a long, fairly gentle slope to the west, but a bold, well-marked escarpment on the east forming an almost inaccessible cliff several thousand feet in height.

The entire area contains many flowing streams, some of which, however, run through narrow and often deep canyons, which make them inaccessible to range stock. Although there is considerable surface water for stock, it is doubtful if well water can be obtained except at a great cost for very deep wells, such lava regions having no great supplies of underground water at reasonable depths. The whole region is drained by the Owyhee River and its numerous tributaries, the water all flowing to the northeast into the Snake River.

Along the Snake River are located some of the most important of the great western reclamation projects, on the irrigated lands of which large crops of hay are now being raised. These areas will be increased greatly in the coming years through additional reservoirs now either under construction or consideration. This guarantees to the stockmen of the region an ample supply of hay on which to depend in handling their stock. North of this river, within comparatively easy reach, lie the national forests in Idaho, the summer ranges of which furnish ideal feeding grounds on which to produce the early lambs for which the region is already well known. South of the area in Nevada and very close at hand is the Humboldt National Forest, one of the finest summer ranges for livestock in the Northwest, while to the west and northwest the several national forests in Oregon furnish equally valuable summer range.

A large number of the sheep which now summer in these forests have used these winter ranges regularly and the owners depend more and more each year upon them for carrying their herds and flocks through the winter months.

There has been comparatively little of this land entered under any of the various land laws. Here and there stockmen have located on watering places, springs, small lakes, and openings along the streams where stock may reach the water in some deep canyon. Through such location the owner of the land has secured the use of the surrounding public domain. The annual precipitation over the whole region is between 8 and 10 inches, of which only about 2 inches falls during the summer growing season. For this reason the region offers no great attractions to the dry farmer, and the amount entered under the 640-acre homestead law has been comparatively small. The winters are fairly mild, and the snowfall furnishes much of the winter water. The losses from winter storms, "northers" blizzards, etc., are very light when compared with the same class of losses from these causes in other parts of the range region.

While this Owyhee range has been excessively grazed it still does not show such wholesale deterioration as do areas elsewhere described in this bulletin, although its original grazing value has, of course, been considerably reduced. The fact that water is scarce has been its salvation by keeping the stock off it during much of the growing season, thus allowing the vegetation to reach a reasonable aerial growth and development.

Idaho fescue (*Festuca idahoensis*) is the predominating forage plant, with considerable wheatgrass (*Agropyron* spp.), balsam root, sunflowers, wild carrot, buckwheat, and other plants palatable to sheep. Bitter brush (*Purshia tridentata*), salt bush (*A. nutalli*), black sage, greasewood, shadscale (*A. confertifolia*), bud sage (*A. spinescens*) form the bulk of the browse feeds.

Taking it as a whole, this Owyhee Desert range is undoubtedly one of the most satisfactory pieces of winter grazing in the whole range region of the West. As stated, its lack of water, together with the extremely rough character of the land, has worked to prevent its utter destruction. At present its use by the local residents and stockmen using the summer ranges in the high mountains to the north in Idaho and the south in Nevada is disputed by wandering bands of sheep belonging in the greater part to alien owners who have no regular ranges, own very little ranch property, and are content to be everlastingly on the move, migrating from one area to the other as the feed grows short or the water gives out. Working back and forth from one State to the other, they often escape paying taxes year after year; and through their utter disregard of reasonable range practices they are destroying the forage at an alarming rate.

At the present time it is estimated that this Owyhee Desert range is used by approximately 500,000 sheep during the winter season. In addition to these a large number utilize it during the summer growing season whenever the summer rains furnish stock water or fresh feed, a time when it should not be grazed at all.

The majority of the established taxpaying sheepmen of Idaho and the near-by States are anxious to have this range placed under some form of Government control, but the owners of the migratory herds have so far been able to prevent any concerted action toward getting the necessary legislation. It offers to-day probably the most satisfactory opportunity in the western range States to obtain improved grazing conditions with the minimum of time and effort. All it needs is some reasonable regulation as to its use during the growing seasons and the prevention of overgrazing through crowding too many sheep on areas adjacent to a permanent water supply.

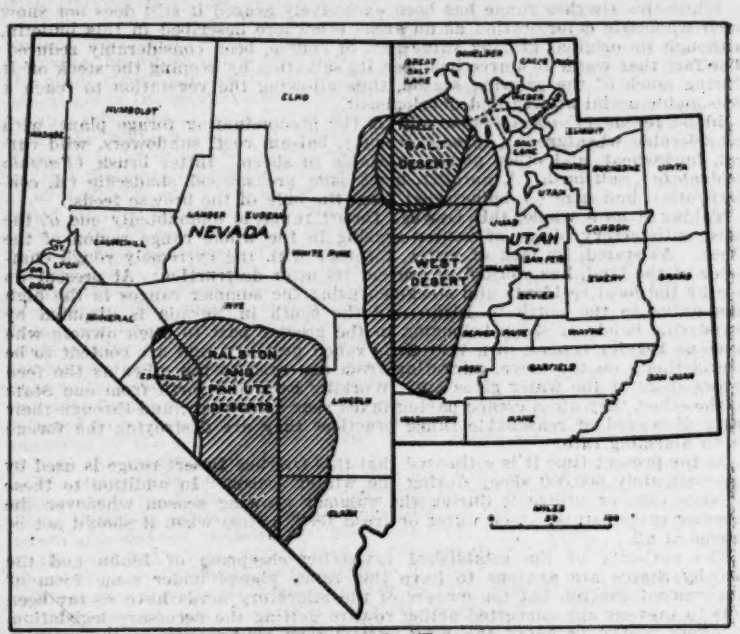
The writer visited the area several years ago, taking a trip through the Idaho section, and was surprised at the character of the range, the condition of the forage plants, and the value of the whole range for winter grazing purposes. The forage cover did not at that time show the general deterioration from heavy grazing that was and still is so evident on similar semidesert ranges in other parts of the arid West. Its greatest value now and in the future is bound to be along the lines of a public grazing common to be used only during the winter season by local stockmen and settlers whose investments in improved ranch property show them to be taxpaying, permanent residents, who will carry out the plans for its management and protection in full cooperation with the officials placed in charge of it by the Government authorities. Not another acre of it should be allowed to pass into private hands, especially

where the supply of water is to be affected by such action. This, of course, does not include any future development of portions of the land which may possibly be brought under cultivation through some approved reclamation project.

Nevada Desert Ranges

Of all the States in the Union, Nevada has to-day the largest remaining unbroken acreage of unappropriated, unreserved public lands. Out of a total State area of over 70,000,000 acres, Nevada contains more than 52,000,000 acres of Government-owned land, or 28 per cent of the whole 186,000,000 acres of remaining public domain.

Because of climatic, soil, and other natural conditions, only a small part of the lands within the State can ever be used for farming under any form of agriculture known and practiced to-day. Much of the 18,000,000 acres that has so far passed into private hands is covered by the land grant to the Union Pacific Railroad, which forms a 40-mile-wide strip clear across the State from



NEVADA AND UTAH

east to west. Here and there within the State where irrigation water has been available the lands brought under that form of agriculture have yielded fine crops of every kind. But under the most favorable conditions it is doubtful if very much more of the surface of Nevada will ever be used for any higher economic purpose than the grazing of livestock.

The annual report of the Commissioner of the United States General Land Office for the year ended June 30, 1924, classifies this entire 52,000,000 acres of public domain in Nevada as "Mountainous, arid, grazing," which indicates quite clearly its general character. It is all, however, of much lower carrying capacity and value than either the Owyhee or West Desert ranges.

About the center of the State are several long, narrow mountain ranges, the peaks of which reach elevations of from twelve to thirteen thousand feet. In the higher areas they carry small but fairly good stands of yellow pine and Douglas fir, together with aspen, liber pine, spruce, and fir. Lower down the timber cover consists of pinon, juniper, and mountain mahogany.

A NATURAL WATER HOLE ON THE PUBLIC DOMAIN. FLOOD WATERS ARE HELD WHICH WATER MANY CATTLE DURING THE SEASON

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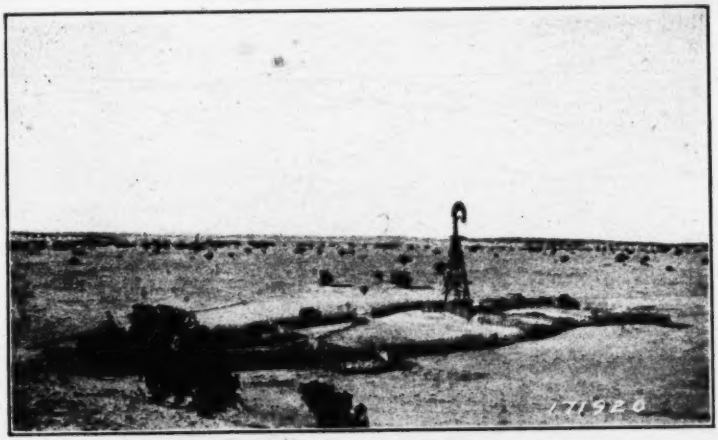
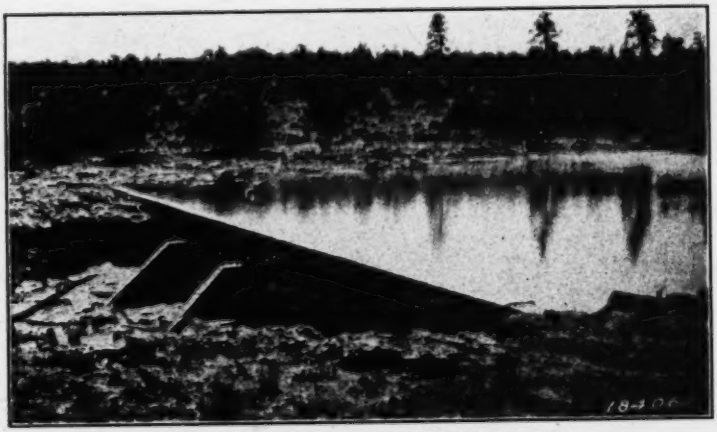


WINDMILL ON DEEP WELL, NORTHERN NEW MEXICO

Such mills are expensive, costing from $1,600 to $5,000 complete. They are rather expensive to maintain, and replacement costs and repairs are high. There are many million acres of public domain grazing lands that can only be used when such watering places are provided



FLOOD-WATER TANK IN NORTHERN ARIZONA

Such tanks cost from $1,000 to $3,000, but built of cement will last for a lifetime

What few streams flow out of the mountains soon lose themselves when they reach the lower, open country, and either evaporate or sink into the desert sands. In the deep canyons of the higher mountains or at the heads of the streams one finds charming little cases, green meadows, waving willows, wild flowers, and ice-cold springs. These, of course, have long since passed into private ownership and are used mainly as headquarters ranches from which the local stockmen handle their herds.

While there are many areas within the State where climate and soil conditions are so severe as to produce almost nothing at all in the way of forage, nevertheless the major portion of the lands may be considered as suitable for grazing livestock during several months of each year, notably the winter season. Owing to the character of the forage, the lack of the stock water, and climatic conditions generally, the use of these lands by sheep is by far the most satisfactory method of utilizing them as a public resource.

In the southern part of Nevada are two large units of desert range of more than ordinary value as grazing grounds with the sole exception of a serious lack of water for stock. If the supply of stock water were even reasonably sufficient and fairly well distributed, these areas, lying principally in Nye and Lincoln Counties, would form one of the best of winter ranges, especially for sheep. They are known as the "Ralston" and the "Pah Ute" Deserts and may properly be classed as purely desert range. They form a region of vast, open, rolling land intersporsed with semimountainous ranges, generally treeless, and extremely rugged and broken in outline.

The precipitation in this region as well as all over the State is light, averaging only about 10 inches annually, fully 75 per cent of which falls during the nongrowing season in the shape of snow. This leaves the summer growing months with very little to encourage the growth of forage plants.

In the two counties mentioned the usual characteristic plant associations are found. The Shadscale (*A. confertifolia*) association according to Shantz[1] probably covers more territory in Utah and Nevada than any other plant community. Winter fat (*Eurotia lanata*), hop sage, bud sage, the salt grasses (*Distichlis*), sacaton (*Sporobolus* spp.), several of the gramas (*Boutelowa* spp.), foxtail and squirrel tail (*Hordeum* spp.) are fairly plentiful in this region, all of which lies at an elevation above 5,500 feet.

The investigations made into the forage plants of this region by Mr. I. Tidestrom of the Bureau of Plant Industry during the year 1917, indicate that in a broad way the plant life in this part of Nevada is very similar to that of the lower Little Colorado River region of northern Arizona. The precipitation, however, is not more than half as heavy as in Arizona, hence the growth of the plants is by no means as strong.

The extremely arid nature of the climate serves to cure the forage plants on the ground, furnishing excellent feed during the winter periods although to the uninformed observer it would seem to be all dried up and utterly worthless as feed for livestock.

Mainly because of the lack of stock water it is almost impossible to graze these desert ranges of Nevada except during the winter months. It is possible then only during periods of heavy snows in the near-by foothills, to which the sheep go for water. For this reason these ranges have lost but little of their original character and value. Nature seems to have successfully protected them from damage by overgrazing.

It is not unlikely that if the Nevada stockmen could be secure in the use of the surrounding ranges for their own livestock, wells would be drilled in search of water, which in all probability could be found at fairly moderate depths. Under existing circumstances, however, no stockman will undertake to develop water on these lands because he has no assurance that others will not at once crowd in on the range and gain the benefit of his expenditure. There are again many places where through the impounding of flood waters in the early spring sufficient stock water can be obtained to make available for winter grazing large surrounding tracts which are not at present used except at rare intervals. No one will attempt to do this, however, knowing full well he could not leave it during the summer months and return in the fall and not find the range grazed completely out by wandering herds whose owners had profited by his industry.

Under some form of Federal or other control, by means of which ranges such as these can be allocated to local stockmen under reasonably long periods

[1] Shantz, H. L., Plant Communities in Utah and Nevada.

of use and with limited numbers of stock, the State of Nevada would find its livestock industry expanding and prospering in a most surprising and satisfactory way.

Open Range Lands in New Mexico

There are several outstanding areas of public domain in the State of New Mexico which in the early days were considered valuable feeding grounds for both classes of livestock. They have, however, been so badly depleted of the original forage plants as to reduce severely their grazing value. The greater part of these areas are of the sagebrush type, far more suitable for winter ranges than for any other purpose.

One of these ranges is located along the Rio Grande in northern New Mexico and southern Colorado. It extends northward from near the town of Taos, N. Mex., to the vicinity of Alamosa, Colo., a distance of about 90 miles, with an average width of about 20 miles. It covers about one and one-quarter million acres of public land. The portion in New Mexico, which is about two-thirds of the whole, lies between the east and west divisions of the Carson National Forest, and is surrounded by national forests and privately owned forested lands where stock find excellent summer range. Winter range is, however, the greatest need of the local stockmen; therefore the preservation and restoration of this land would add materially to the success and up-building of the livestock interests of the region.

This area is fairly well watered, which perhaps is one cogent reason for its present poor condition. There is plenty of shelter in the form of scattered bodies of pinon, cedar, and juniper. The average annual rainfall is between 15 and 20 inches, much of it coming during the growing season. The area all lies at an elevation of about 6,000 feet, with considerable snow in the winters, while as a rule the spring months are apt to be late, cold, and accompanied by high winds. Lambing operations on the range here have always been extremely risky, and it is neither a safe nor successful lambing range.

Originally nearly all of this land lying in New Mexico was included within the boundaries of the Carson National Forest. Under a misapprehension as to the policies and plans of the Government in allowing settlement on national forest lands as well as in administering grazing lands, a determined effort was made by local residents to have the major portion of these lands eliminated from the forest. The claim was made that it was not forested land in the real sense of the word, it being classified by forest experts as woodland type, being a mixed stand of pinon, cedar, juniper, etc. It was also declared to be needed by bona fide settlers for homesteading under the land laws then in existence, and that its elimination would stimulate settlement of the lands and bring homeseekers into the region.

As a matter of fact, after the elimination of over 700,000 acres in 1909, only a few homesteads were entered on the area; while freed from all control and protection and exposed to overstocking and overgrazing, it was soon robbed of any value it once had for grazing purposes. Not until after the passage of the 640-acre grazing homestead bill were any inroads by settlement made into this land and then not by a settled, contented class of home builders.

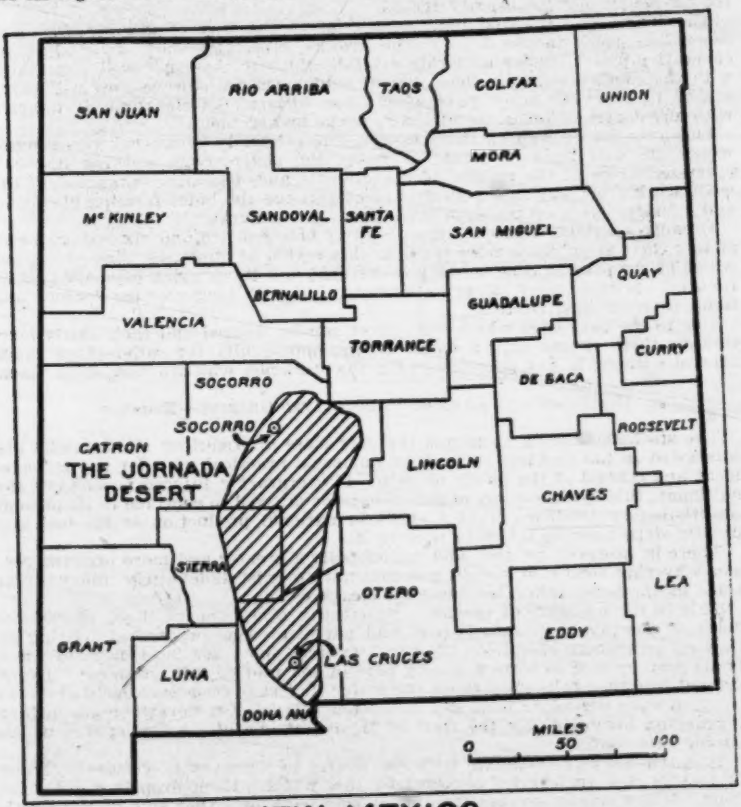
The problem of settlement on this area has been discussed at some length on page 1629. At the present time nobody depends upon it for regular use, but it is a case of first come first served. If there is a small amount of feed at the beginning of winter it is at once so heavily stocked that within a very few weeks the whole area has been worn out by the constantly moving bands of sheep. Nobody has really received any benefit from the grazing, and the herds that remain here suffer heavy losses and come out in the spring weak and poor.

The forage plants are similar in character and value to those found on like areas, such as the Red Desert region of Wyoming. Sages, winter fat, shadscale, etc., are the main browse feed, while in addition to the wheat grasses of the northern ranges the gramas are found here, and together with some of the salt grasses (*Spicata* spp.) and sacaton (*Sporobolus* spp.) formed originally a goodly portion of the grass feed.

As a whole this New Mexico-Colorado desert range was originally one of the finest winter ranges in the whole Southwest. It had all the valuable adjuncts of water, shelter, nearness to summer ranges, together with a great variety of forage plants suitable for winter grazing. These conditions tended naturally to bring about its utter ruin under unrestricted, free-for-all grazing.

It is an interesting fact that many of the persons who once signed petitions demanding that these lands be eliminated from the original national forest established in the upper Rio Grande Valley have since lived to realize their mistake and are now quite as anxious to have them placed again under Federal supervision, either to be restored to the national forest or else set aside as a grazing reserve to be administered by Government officers along the same lines and under the same policies as are the grazing lands in the national forests.

This area is not large when compared to other semidesert ranges, but it has a high value to the local stockmen as a winter range in a region where such range is extremely scarce. It should be saved from further spoliation and destruction, its grazing value restored through reasonable restrictions and used for its highest economical purpose, which is winter grazing.



THE JORNADA RANGE REGION

In southern New Mexico in the Rio Grande Valley lies what is known locally as the Jornada—the "Jornada del Muerto" or "journey of death"—so called from the unhappy experiences of the early Spanish "conquistadores" traveling across this treeless and waterless region. They lost many animals and some of the members of their parties from thirst.

These typical semidesert ranges lie at elevations of between four and five thousand feet and are of high value for the grazing of livestock, especially cattle.

"It is one of the most arid regions of the Southwest. The records for 57 years at State College, N. Mex., show an annual average precipitation of 8.60 inches, with precipitation for individual years running as high as 17 inches and as low as 3.50 inches."*

Fortunately the greater part of the rainfall comes in the summer in the midst of the growing season. Water is scarce on the surface but obtainable in large supply in wells of comparatively shallow depth. Black grama (*Bouteloua eripoda*) is the best and most highly prized grass. Needle grasses (*Aristida* spp.), tabosa grass (*Hilaria mutica*), and alkali sacaton (*Sporobolus* spp.) are some of the other important grasses. These, with a vast variety of browse plants of the sages, shadscales, and other desert shrubs, furnish forage that not only enables the stock to grow but also fattens them for market if the ranges are not too heavily grazed.

These ranges will stand more real grief in the way of grazing than any other like areas in the West. The grasses especially show astounding recuperative powers under moderate rainfall which to those not well acquainted with the conditions seem almost unbelievable. On an average they will carry a cow to every 40 acres year after year without deterioration, if handled with any degree of judgment and good range management.

Sheep do not do well on these ranges, due primarily to several awn grasses which are extremely injurious to sheep, the sharp awns working into the eyes and inside of the mouths of the animals and, becoming entangled in the wool, work their way into and ofter clear through the hides forming blemishes and offensive spots on the flesh when dressed for market.

Broadly speaking, there is approximately between five and six million acres of this class of public domain lands in this region of unusually high value, but which at the present time is badly overgrazed and its carrying capacity greatly reduced. It is a region of severe droughts but with long growing seasons and comparatively mild winters.

Due to the ease with which well water can be secured and their fairly level contour these ranges offer a most inviting opportunity for satisfactory range control without in any way disturbing the stockmen who are now using them.

Effect on the Land of Unregulated Grazing—Erosion

The stockmen are by no means the only class of American citizens who are interested in the problem of working out some practical plan for the management and control of the public domain. If overgrazing injured no one but the stockman, this whole subject might perhaps be allowed to continue in its present unsatisfactory condition until a crisis in national production is reached and drastic steps must be taken to remedy it.

There is, however, another and undoubtedly a greater and more pressing reason why this condition should not continue to exist indefinitely and without some means being taken for remedial measures.

This is the question of erosion. Practically every one of these 186,000,000 acres of the public domain is part and parcel of some watershed. Lying as they do at average elevations of over 5,000 feet above sea level, most of these lands may be said to form a goodly part of the roof of this continent. Every drop of rain that falls upon them, the water that runs from each melting snowbank, at once begins its long, devious, often delayed, but nevertheless constant journeying toward either the Gulf of Mexico or one of the two oceans which border this continent.

It is impossible to estimate with any degree of accuracy how many millions of tons of soil are carried seaward by this water. Each drop is a potential flood. Every rivulet flowing from some snowbank on either side of the Continental Divide carries small particles of soil in its roiled waters. Joined by other rivulets it grows in size and often becomes a flood that moves mighty masses of earth and stone, fills the clear mountain streams with débris of every kind, chokes the irrigating ditches of settlers in the valleys below, and, gaining strength and volume, overwhelms towns and cities, buries the farmer's fields under worthless silt, wrecks bridges and railroads, and fills the mouths of our great rivers with waste material that costs millions of dollars each and every year to keep dredged out sufficiently to allow shipping to enter or leave our harbors.

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* Range and cattle management during a drought, by Jardine and Forsling, U. S. Dept. Agr. Bul. 1031.

ROUTT COUNTY, COLO.

Meadow ruined by overgrazing. With the removal of the forage plants erosion began, culminating in the cutting of the deep arroyo shown in the center which acted as a drain for the whole area, completely destroying its value and rendering it a liability rather than an asset

RANGE IN NORTHERN NEW MEXICO

With the removal of the forage cover erosion began and continues

This situation has been brought about by erosion, and it is this damage to these remaining public lands through their overgrazing and the denudation of their protective cover that should appeal to the general public far more than the single one of grazing, a matter that comes home directly to but a comparatively small part of our people.

It is estimated by competent engineers that more than 406,000,000 tons of sediment is carried each year from the land areas along the Mississippi River[1] and its tributaries, finding its way into the Gulf of Mexico. This would cover one square mile of surface 241 feet deep. These huge deposits are continually raising the bed of the river, to meet which the State and Federal Government together have expended millions of dollars in the construction of improvement works in the form of levees and embankments to restrain the floods and protect the rich lands on each side of the Mississippi River.

Studies in erosion prove beyond all question that incalculable amounts of soil are moved by every rainfall upon moderately inclined watersheds. Soon after the creation of the Manti National Forest in the Wasatch Mountains in central Utah the Forest Service began a systematic study of the effects of uncontrolled and unlimited grazing upon that watershed. For several years previous to that time the town of Manti and several prosperous communities on the west side of this range had suffered from a series of floods that filled their irrigation ditches and in some instances deposited in the streets of their towns huge boulders and tons upon tons of sand and silt carried down from the higher ranges by the force of the water. It was the unanimous opinion of the people of the region that the floods were caused by the removal of the forage cover of the mountains by excessive grazing. Instead of soaking deep into the soft porous surface soil the rains ran off the ranges as from a dry roof.

As rapidly as possible the number of stock was reduced. Those which were allowed to continue to use the area were carefully handled, and not allowed to enter the ranges before the soil was dry enough to prevent damage by the trampling feet of the stock and the tender young plants had reached a safe size to withstand grazing without injuring them. Further, no more stock were allowed to use the lands than in the judgment of competent officials could do so and still allow the forage plants to revegetate the denuded areas.

The experiment, for such it really was, has been a success. Within a comparatively few years the vegetative cover has renewed itself to such an extent that the old-time floods are almost a matter of past history. There have been very few floods in the past 10 years, the irrigating ditches do not fill up with débris as they formerly did, and the original cover conditions are being restored gradually.

It has required no arguments to convince the farmers in the vicinity of the Manti Forest of the efficacy of the plan for their relief. They believe absolutely that the floods which ruined hundreds of acres of their best farming lands and filled up beyond hope of repair miles and miles of their irrigation ditches were caused by overgrazing.

The Forest Service established an experimental station on top of these mountains especially equipped to study this phase of the grazing industry. Two adjacent tracts of approximately ten acres each lying on a small watershed were selected for experimental purposes. Both drained into the same "wash" or "gully," at the lower end of which three large cement reservoirs or settling tanks were placed, tandem, so that every drop of water flowing from the areas would pass through the tanks one by one. The sediment settled to the bottom, and the water finally ran from the lowest perfectly clear and carrying with it little or no sediment or foreign matter.

When the storm was over the water from each tank was drawn off, the deposit removed, air dried, and weighed. With a known drainage surface and the establishment of the exact weight of the sediment carried into the tanks it was an easy matter to estimate the amount of material that was removed from such areas by each inch of rainfall or other precipitation that fell upon it.

It is not necessary to go into details as to the results of these scientific studies in the matter of run-off from such lands. A single illustration from the many in the station records will show the vast, almost unbelievable amount of soil removed by water from watersheds where the ground cover has been removed or injured in even the slightest degree.

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[1] The Mississippi River. Humphreys and Abbott, p. 149.

On July 21, 1915, rain began at 12.15 p. m. and ended at 1.10 p. m., a period of 65 minutes. The total precipitation during this time was 0.70 of an inch. When the material was weighed it showed a total deposit of 716.9 cubic feet of soil, or on a basis of 70 pounds to the cubic foot, 50,184 pounds, almost exactly 25 tons of air-dried material torn from the surface of these two small areas and carried away by the force of the water from this one storm.

The averages for seven years at this station show that approximately 172.5 cubic feet or, by weight, a little over 6 tons of soil has been removed from each acre of these areas every one of the seven years. When it is remembered that this is the best part of the surface soil, rich in humus, and needed for the growth of the forage plants, brush, etc., the tremendous losses which the surface areas of this country are incurring year after year can more readily be comprehended.

Other experiments[19] on these areas covered comparisons of the soil removals by erosion for a period of years, during which time the land was grazed by sheep regularly and with due regard to the future of the plant life on the areas. Then for another period of years the observations were continued but no grazing was allowed on them. The results of these experiments proved conclusively that the run-off from grazed land can be expected to be heavier and the soil removal greater than from a surface ungrazed and covered with the natural forage growth peculiar to the region.

It is not the purpose of this argument to discredit the use of all lands suitable for the grazing of livestock. Such an argument could be followed logically so far back as to bring into question the removal of the timber, underbrush, grass, and forage that originally grew upon the majority of the lands now under cultivation in the Mississippi River Valley. The people of this world must be fed, and the removal of the timber preceding the use of the plow is a logical and wholly proper action. This, however, does not mean that every acre of land in this country from which the timber and grass covering has been removed should have been dedicated to crop production. Millions of acres have been cleared from which the original protective vegetative covering should never have been removed or the surface of the soil beneath them disturbed by the farmer's plowshare. The losses from erosion on millions of acres of high-priced farming land in the Corn Belt States are appalling, and seemingly comparatively little is being done to combat it. Hillsides which should be in grass sod and used for pasture purposes only are plowed and the soil stirred up to be carried by the first rains into the near-by streams and rivers.

Gullies through the middle of productive fields begin with mere trickles down the gentle slopes, which within a few years have rasped their devastating way down deep into and generally far below the valuable top soil, and yet comparatively few appreciate this loss and the imperative need of using some methods for controlling it. It is absolutely certain that on those areas of the public domain from which the forage cover has been so ruthlessly removed by the unrestricted grazing of livestock progressive erosion is now going on. This will in the final analysis imperil the very foundations of the western livestock industry, which depends almost entirely upon grazing methods for the production of livestock of all kinds.

It is this phase of the situation that should have a vital appeal to every citizen of this country, whether stockman, farmer, laborer, or business man.

It should interest dwellers in towns and cities where the supply of water for domestic uses comes almost wholly from the near-by mountains and hills.

It should appeal to the residents of seaboard cities, the harbors of which are kept free from silt carried down by the streams through costly dredging operations.

It should interest every farmer who must replace with high-priced fertilizers the fertile soil washed away from his farm lands.

Movements Looking Toward Range Control

First demands for range control—The Transylvania law

It is interesting to learn that the idea of range control is not altogether a modern innovation, as most students of this subject undoubtedly believe. In March, 1775, Daniel Boone, the mighty hunter and pioneer who had been em-

[19] Forsling, C. L. Summary Progress Report MS. Great Basin Experiment Station, 1923.

ployed by Governor Denmore of Virginia to conduct a crew of surveyors to the falls of the Ohio River, began the erection of a fort in what is now Madison County, Ky., in the central portion of that State. To this fort Boone brought his wife and daughters and his brother, Squire Boone. Colonel Henderson, a Virginian, had purchased from the Cherokee Indians some 90,000,000 acres of wild or public land, upon which he intended to organize what he called the "Colony of Transylvania." (Collins's History of Kentucky.)

Henderson, who was the first and only president of this long-since-forgotten republic, established his capital at Boone's Fort, or Boonesboro as it was later called. Naturally the new colony required laws for its government. Henderson called a convention at Boonesboro, and on May 23, 1775, six men met and drew up and passed nine separate laws as the basis of a code for the new colony. Of these nine laws three are of particular interest to the livestock industry. They are entitled:

"An act to preserve the range; that is, the right of public pasture.

"An act for preserving the breed of horses.

"An act for preserving game."

A close search through every available source of information fails to discover more than the titles to these nine laws. Their wording has been lost to posterity. Shaler's History of Kentucky, page 69, says:

"The foregoing laws have not come down to us in detail. We have only their titles."

It certainly would be interesting to know the exact phraseology of the law for preserving the range. Considering, however, the various statements made by early writers as to the damage done to the forests and ranges by the livestock of the Virginia settlers, as well as their comments on the wretched physical condition of the animals themselves, it is but reasonable to assume that this law was intended to restrict in some degree the wasteful use of the range by livestock. If this assumption be true, then this is the first known attempt to regulate by law the use of the public domain for grazing livestock.

Boone was a member of this convention, and as he had been a cattle owner in the Virginia colony it is not unlikely that he was responsible for the measure. After the passage of these nine measures the convention adjourned to meet again in September, 1775, but never reassembled, the colony of Virginia having stepped in and protested Henderson's action in acquiring the land. Thus ended the colony of Transylvania.

MAJOR POWELL'S PLAN

There seems to be no record of further agitation along these lines until in 1878 when Major Powell, then head of the United States Geological Survey, made an investigation into the values and future uses of the lands of the arid region. (Lands of the Arid Region of the United States. Powell, J. W., Report U. S. Geological Survey, 1878.) He proposed first a systematic classification of the lands as irrigable, nonirrigable, timber, pasture, mineral, coal, etc. Under the head "The land system needed for the arid region." Major Powell proposed a plan for the management of such of the western lands as this classification would list as valuable largely for pasturage purposes. He felt they should be granted to each settler in comparatively large units. In this report Major Powell further outlined a bill under which Congress was to authorize the organization of pasturage districts. Nine or more homesteaders or settlers could organize such a district, each settler to select and file upon a tract of not more than four sections, or 2,560 acres, to include not more than 20 acres of irrigable land. Title to all minerals, etc., was to be reserved to the Government. The surveys of these districts to be made according to contour lines somewhat as has been done in Australia. This was to prevent one man from "shoestringing" his claim along both sides of a water course shutting out others from obtaining a fair share of the stream for both irrigation and stock-watering purposes.

Powell believed sincerely that under this combined system of irrigated farms and pasturage homesteads the West would soon be settled up by bona fide homebuilders whose primary business would be livestock raising, and the pasture lands would thus serve their highest economic purpose through the grazing of livestock. Unquestionably Major Powell's proposed grazing bill was the first measure ever drawn up for such purposes, although it was too many years in advance of public sentiment to get legislative attention or action.

OTHER PROPOSED PLANS

While the question of some sort of control of the public domain had been discussed at livestock meetings here and there throughout the western range States for the previous two or three years, it had not become a matter of general interest until about 1898. At the first meeting of the National Livestock Association held at Denver, Colo., in that year, there was considerable discussion of plans for meeting the problem along two distinct lines. One was a direct transfer to the States of all the remaining public lands lying within the boundaries of each State and still in the hands of the Federal Government. This idea was generally designated as the "ceding of the arid lands," and the plan had many strong advocates. The other was the leasing of the public domain by the Federal Government. It is well to note here that in the beginning of this discussion there was absolutely no thought of range management under the permit system as worked out later by the Forest Service in its handling of the grazing ranges in the national forests.

Neither of the above-mentioned ideas met with the general support of a majority of the western livestock men. The whole idea of a controlled range was new and untried. They had been using the public domain for many years free of charge and without any restrictions whatever excepting those which they themselves originated and made effective. "Why venture into unknown, uncharted seas?" they asked. The advocates of the leasing system also found themselves opposed by many small owners who feared in any leasing system, no matter how carefully safeguarded, a monoplization of the ranges by the large stock owners and livestock corporations. There was also much opposition from friends of the homesteaders, who claimed that under a leasing system even were the homesteader given the right to enter fenced areas of leased land and file on a homestead he would nevertheless hesitate to do so, fearing objection and reprisals on the part of the lessee.

The advocates of making a free gift to every public land State of the remaining public lands within its borders were opposed by men who doubted the ability of the States to handle these areas on a fair and just basis, believing sincerely that local politics would rule in their disposal to the injury of the small owners. There was also objection on the part of citizens of the eastern part of the United States against this on the grounds that the lands were the property of all the States, had been specifically reserved by the Federal Government when the States had been admitted to the Union, and should therefore be retained by the Government as a part of the general resources of the Nation.

The more the matter was discussed the wider grew the gulf between the different elements interested in it. While many stockmen grazing their herds on the public lands admitted that the areas were deteriorating, recognized the necessity for some sort of control, and also acknowledged frankly that unless something was done to stop the destruction the lands were doomed as a grazing resource, it was impossible to get them to agree on any definite plans for the management of these areas. They knew the patient was seriously ill and needed a doctor, but never did they agree as to what doctor should be called. An active majority, fearful of some hidden danger in any of the plans offered, adopted a "let us alone" policy, fearing to "fly from ills that were to evils they knew not of."

PERMIT OR LEASE—WHICH SYSTEM?

Broadly speaking, the sheep-grazing interests of the West were almost uniformly opposed to any plan that was suggested. The cattle owners using the public domain, however, were generally favorable to some form of control similar to that which the Forest Service was working out in administering grazing ranges within the national forests. This was the permit system, which avoided the pitfalls of the leasing of definite areas to be under the absolute control of the lessee and substituted a system that permitted each stockman to graze a certain number of livestock under a permit which stated the exact number of stock he was to graze and allotted sufficient range in the forest upon which to graze them.

These permits did not recognize the right to use any specific range year after year, but provided that as far as possible the same ranges would be allotted, subject to necessary changes due to new permittees coming in and

certain withdrawals of areas for watershed protection or other and higher needs of greater importance to the public than the grazing of livestock. This latter included such important public functions as the protection of the water supply of cities and towns within or adjacent to the national forests, the protection of the forest growth, the protection of the wild life, game, etc., and the watersheds of the great reclamation projects throughout the West, where the question of heavy grazing and silt deposit in the reservoirs was and still is a very vital matter.

All these points were fully covered by the permit system, which seemed at once flexible and just. Flexible, wherever it became necessary to consider grazing as a secondary use subservient to some higher need, and just in that it provided sufficient land for the needs of each permittee, which could be readily increased or decreased as the conditions made necessary.

The two ideas "ceding the arid lands" and "leasing the public domain" persisted for a few years, but the instant success of the permit system as introduced by the Forest Service was so great that those interested in the question of controlling the public domain concentrated on and advocated that system in all their plans as the most suitable for meeting the constantly changing conditions on the public domain. The only point at issue with the advocates of this method of control has been the question as to which of the departments of the Federal Government should be charged with the responsibility of enforcing any law that Congress might pass covering the subject. The stockmen themselves generally indorsed the Department of Agriculture as best qualified, believing it to be wholly a matter of crop production. Others looking at it only as a matter of land administration have urged that it be placed under the direct charge of the General Land Office of the Interior Department, that bureau having general control of the public domain as far as the administration of the several homestead and other land settlement laws is concerned.

ROOSEVELT'S PUBLIC LANDS COMMISSION

In 1903 President Roosevelt recognized the imperative need for some logical action looking to the preservation of that part of the public domain more suitable for the grazing of livestock than any other agricultural use. He decided that the matter was of so much importance as to justify the creation of a special commission for the express purpose of studying the situation and advising him, and through him the Congress, as to the most practical means of saving from further spoliation the remaining areas of the public domain.

On October 22, 1903, he appointed the following gentlemen members of what he designated as a Public Lands Commission: W. A. Richards, Commissioner of the General Land Office; H. Newell, Chief Engineer of the Reclamation Service; and Gifford Pinchot, Forester of the Department of Agriculture.

In his letter to the members of this commission Mr. Roosevelt asked them to—

"Report upon the condition, operation, and effect of the present land laws and to recommend such changes as are needed to effect the largest practical disposition of the public lands to actual settlers who will build permanent homes upon them and to secure in permanence the fullest and most effective use of the resources of the public lands."

In establishing this commission the President had in mind two distinct things: First, the establishment of the homesteader on such areas of the public domain as were suitable for such use; and second, to make suitable recommendations for further legislation as to the best possible use of what was found not to be suitable as a farm unit on which could be established agricultural homesteads. The members of this commission were all deeply concerned with this question. They had already studied it from many angles, and pursuant to Mr. Roosevelt's orders spent nearly two years in careful personal field investigations covering every part of the western range regions. Questionnaires were sent to over 1,400 western livestock men then using the public lands for grazing purposes, in which they were asked to state their views as to the best methods for preserving what was left of the public domain, together with suggestions for its future use. The result of this survey is summarized from the report to the President made in February, 1905, as follows:

"The great bulk of the vacant public lands throughout the West are unsuitable for cultivation under the present known conditions of agriculture, and so located that they can not be reclaimed by irrigation. They are, and probably always must be, of chief value for grazing.

"At present the vacant public lands are theoretically open commons, free to all citizens; but, as a matter of fact, a large proportion has been parceled out by more or less definite compacts or agreements among the various interests. These tacit agreements are continually being violated. The sheepmen and cattlemen are in frequent collision because of incursions upon each other's domain. Land which for years has been regarded as exclusively cattle range may be infringed upon by large bands of sheep, forced by drought to migrate. * * * There are localities where the people are utilizing to their own satisfaction the open range, and their demand is to be let alone, so that they may parcel out among themselves the use of the lands; but an agreement made to-day may be broken to-morrow by changing conditions or shifting interests.

"The general lack of control in the use of public grazing lands has resulted, naturally and inevitably, in overgrazing and the ruin of millions of acres of otherwise valuable grazing territory. Lands useful for grazing are losing their only capacity for productiveness, as of course they must when no legal control is exercised. * * *

"Prompt and effective action must be taken, however, if the value of very much of the remaining public domain is not to be totally lost.

"Your commission concurs in the opinion of the stockmen that some form of Government control is necessary at once, * * * and recommends that suitable authority be given to the President to set aside, by proclamation, certain grazing districts or reserves."[11]

GRAZING LANDS IN SCHEME OF NATIONAL CONSERVATION

In May, 1908, President Roosevelt, realizing the urgent need of definite plans for conserving the natural resources of this country, called into consultation in the city of Washington the governors of the several States, together with a distinguished list of men prominent in American political, economic, and scientific life. The meetings were held in the East Room of the White House, the President himself presiding. In his opening address he laid before them in very plain, definite language the urgent necessity for a national conservation program which would protect from further spoliation and waste all the great natural resources of this country. These, he said, were the lands, forests, water, coal, oils, and other mineral deposits, each of which he firmly believed should be under some definite management and protection that we and those coming after us might enjoy all of them to the full, using but not wasting them.

Mr. Roosevelt was especially keen for some form of Federal control for handling those areas of public domain which for lack of water or other causes were not susceptible of growing crops under any of the present-day methods of agriculture. These lands, the property of the people of the whole country, were being exploited by a comparatively few citizens simply because there were no laws, either State or Federal, that provided for their control and protection. This, he stated, should not be allowed to continue, urging prompt passage by Congress of a law which would give these areas proper supervision under Federal authority.[12]

The inspiration of Mr. Roosevelt's arguments for conservation set in motion a train of action following which practically all but one of the great national resources which he mentioned at this meeting have been taken in hand and some remedial measures applied. The single exception is the grazing land of the public domain, for which nothing has as yet been done in the way of even moderate measures of protection, although the same destructive forces have been continually at work on every acre of it; erosion has increased; the old, nutritious grasses and forage plants have almost ceased to exist on many areas, and what was once a national asset has become almost a national liability.

Of the 1,900,000,000 acres which form the land surface of the present United States, exclusive of Alaska and our island possessions, there remained on

[11] Report of the Public Land Commission, Senate Document No. 189, 58th Cong., 1903.
[12] The writer, representing New Mexico at the conference, read a paper on the subject of control of the public domain at this White House meeting.

July 1, 1924, but 186,605,000 acres of what is classed in the General Land Office of the United States as "unappropriated and unreserved public lands."

The following table shows the amounts so classified and still open to entry under the several land laws for the States commonly known as the public-land States on July 1, 1924. (Circular No. 950, General Land Office.)

Acreage by States

	Area in acres		
	Surveyed	Unsurveyed	Total
Alabama	36,140		36,140
Arizona	4,501,100	9,305,760	13,806,860
Arkansas	233,599		233,599
California	15,394,903	4,231,269	19,626,172
Colorado	6,446,425	1,150,545	7,596,970
Florida	78,606	1,000	79,606
Idaho	7,897,659	1,913,372	9,811,031
Kansas	2,038		2,038
Louisiana	8,876		8,876
Michigan	71,691		71,691
Minnesota	264,225		264,225
Mississippi	18,546		18,546
Montana	5,775,933	1,008,353	6,784,286
Nebraska	30,671		30,671
Nevada	31,708,466	20,573,812	52,282,278
New Mexico	4,315,523	2,048,246	16,363,769
North Dakota	131,659		131,659
Oklahoma	34,533		34,533
Oregon	13,233,611	186,610	13,420,221
South Dakota	212,606	29,399	242,005
Utah	12,447,778	16,319,909	28,767,687
Washington	981,462	227,923	1,209,385
Wisconsin	4,652		4,652
Wyoming	15,265,660	422,164	15,687,833
Grand total	129,186,371	57,418,362	186,604,733

The lands in the original thirteen States—Connecticut, Delaware, Georgia, Maryland, Massachusetts, North Carolina, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, South Carolina, and Virginia—also in Texas, never formed a part of the public domain; their disposition is governed by the States laws, and information concerning same should be sought from the State authorities.

The report above cited also classifies roughly the character of these remaining acres of public domain as farming, agricultural, grazing, rough broken, mountainous, etc. The major portion of these lands is classified as fit for grazing only. The facts are that since the passage of the original homestead law in 1862 the public lands have been combed over year after year by swarms of homeseekers, with the result that what is now left is not capable of being used as the basis for a satisfactory farm homestead. Its main value is through its utilization for the grazing of livestock by local residents who own improved homesteads in its immediate vicinity and to whom it is now and always will be far more valuable for that than for any other purpose.

With his keen appreciation of securing favorable public sentiment as a necessary background for any great movement, Mr. Roosevelt went direct to the western range stockmen for their assistance in his plans for conserving the public lands. They were the men most intimately concerned as well as best informed as to the need for some administrative control over them. Accordingly, in January, 1907, he appointed a committee of practical western range stockmen and asked them to meet in Washington and advise with him as to the best means of handling the matter. This committee consisted of Senator Francis E. Warren, of Wyoming; Henry A. Jastro, of California; Frank M. Stewart, of South Dakota; Martin Garn, of Idaho; and Will C. Barnes, of New Mexico. This committee organized and spent some time in consultation in the Capital City.

After giving the subject full consideration the committee reported to the President that in their judgment the remaining areas of unappropriated and unreserved public domain were in bad condition from overgrazing and should

be at once placed under the control of the Secretary of Agriculture with power to promulgate such rules and regulations for its use for grazing purposes as in his judgment were necessary and practical. This committee considered the matter as not a question of land administration, but one of crop production, thus falling strictly within the province of the Department of Agriculture.

Mr. Roosevelt's enthusiasm for this measure was great, and he did everything in his power to secure the passage of the needed legislation while he was in office, believing sincerely the measure would be not only of national benefit but, apart from that, would put the range-livestock business of the West on a firm foundation commensurate with its needs as an industry.

Mr. Roosevelt had seen some of the western ranges in their original condition, almost untouched by grazing animals except the buffalo and other big game, and knew how fast they were being depreciated through uncontrolled grazing. Excepting such compartively small areas as might be brought under the plough through irrigation, he believed the bulk of the remaining public domain was most valuable to the nation as a public grazing commons to be held for that purpose forever.

Leasing Values of Grazing Lands

It is absolutely necessary in any study of a plan of management for the public domain grazing lands to have some knowledge of what stockmen are paying for the grazing use of lands of comparable value. This in order that the charges for its use, if such a charge is made, should have some reasonable economic basis.

The Forest Service has recently completed a very wide and comprehensive inquiry into the grazing values of lands in private ownership used in connection with the grazing of livestock in the various national forests throughout the range States.[12] This study involved the consideration of no less than 1,125 different tracts of land leased by stockmen, covering over 9,000,000 acres lying in the 11 western range States. The period covered by the leases averages about 10 years, in some cases running for as many as 15 years. Wherever the lands were of unusual strategic value, giving the possessor of them control of water on the public domain, or through the use of the water on the private lands enabling the lessees to control adjoining public domain ranges, they were excluded from the study, the plan being to use for study only those lands which were comparable with the grazing lands of the adjoining or near-by national forests and used for the greater part of the year by national forest grazing permittees.

The figures so gathered show the prices paid by the range stockmen, voluntarily and under the ordinary requirements of their range business, and generally not under pressure or unusual conditions of injurious rivalry or competition. They may very properly be considered to show the true commercial value of these lands according to the judgment of the stockmen leasing them. Frequently, where private lands have been leased under competitive bids, as on a number of large Indian reservations throughout the West, the prices paid have been greatly increased by competition for possession of the land. Such lands were excluded from the Forest Service study and were not considered.

The following figures have been taken at random from this range appraisal report and are used here merely to give the student of this subject some definite information as to what the lands in the public domain may be considered to be worth to the stockmen if placed under some form of Government control and handled under the permit system. It is important to understand that generally the lands covered by the range appraisal report are of much higher carrying capacity and value than the general average of the remaining portions of the public domain.

State and Railroad Lands

Atlantic and Pacific Railroad Grant in New Mexico and Arizona.—Approximately 3,000,000 acres are under lease at prices that average from 2½ to 3 cents per acre. This land is not of high carrying capacity under normal conditions and will require not less than 50 acres to the cow for a year-long period.

[12] Report printed in full on page 17, part 1, Senate committee hearings, April 17, 18, and 21, 1925.

The demand for these Arizona and New Mexico lands is not heavy. There are many large areas of public domain intermingled with them which prevents their exclusive use by the lessees, excepting where they can be consolidated with State lands as outlined elsewhere in this bulletin.

Oregon.—In this State the private lands are generally timberlands of good grazing values owned by large corporations, held in small units not always lying adjacent to each other. Stockmen lease them and when inside a national forest, exchange the grazing with the Forest Service under a free private land permit.

For sheep-grazing purposes these lands are bringing an average of about 6.8 cents per acre for tracts outside the national forest and 12 cents inside the forests. These prices are the result of the stockmen's needs, especially sheep owners, for additional range on which to graze their stock, the acreage in public domain areas having been greatly reduced in recent years.

Privately owned lands within the forest boundaries frequently bring a greater price than those outside because, for grazing purposes, they can be exchanged acre for acre with the Forest Service under regulations of the Secretary of Agriculture, the Government allotting the range in a solid block and on actual carrying capacity basis. In return, under the terms of exchanges, the private lands are allotted to other forest permittees the same as if they were Government lands. The usual restrictions of the Forest Service as to maximum number of stock grazed by a single individual or corporation do not affect lands so exchanged. Few, if any, of these lands are comparable with the average public domain areas in Oregon, being of greater value in every way.

In the Blue Mountain region of eastern Oregon where sheep growing is the dominant industry the strong demand for grazing lands has resulted in high prices being paid for the use of private lands, generally timbered areas owned by large lumbering interests. These prices average about 15.3 cents an acre for sheep use during a rather short summer season of not to exceed four and a half months. These lands are leased in comparatively large blocks, but only under annual contracts. The contracts, however, are almost uniformly renewed without break or delay.

These prices are probably the highest paid for strictly sheep-grazing lands in large blocks in the entire West. There is a record of one large tract of railroad land which is leased by a large operator at the present time (1925) from the original owners for 15 cents an acre flat, and subleased in smaller tracts to sheep grazers at a uniform price of 25 cents an acre.

Eastern Washington.—Railroad sections leased in large blocks average 6.3 cents per acre for sheep grazing. Most of these lands are comparable in grazing values to what is left of the public domain in that region.

Wyoming.—The major portion of the grazing lands belonging to the State and railroad are leased at an average of about 5 cents per acre.

California.—The Southern Pacific Railroad Co. leases over 944,000 acres of its lands in alternate sections in the vicinity of the various national forests at an average price of 6 cents an acre. These leases run for only one year, but are renewed regularly year after year without disturbance to the lessees or attempts to increase the price.

Idaho.—For several years previous to 1924 the State lands in Idaho, generally school sections, were uniformly leased at 15 cents an acre for grazing purposes. This was reduced to 7 cents in 1924 by the State authorities because of the distress in the sheep industry throughout that State.

One block of 96,700 acres of private land leased by the Eastern Idaho Grazing Association is now bringing 9 cents an acre flat. Much of this land is used for spring lambing. Its general carrying capacity is slightly under 1 acre per sheep and 6.3 acres for one cow for the summer season, with a general average use of five months. This is rather high-grade grazing land.

In the region adjacent to the Minidoka National Forest in southern Idaho, the Southern Pacific Railroad Co. leases some 69,000 acres of its grazing lands to one stockman at a price that averages about 1½ cents per acre.

The Utah Construction Co. leases over 323,000 acres of land in the same region from the same railroad company at an average of 2 cents per acre. The major portion of both these areas may be classed as strictly winter range, being semidesert in character and not very well watered. It probably will class with the average of the lands in the public domain in Utah, Nevada, Arizona, and Wyoming, and will require an average of from 50 to 60 acres to the cow on a year-long basis.

Colorado.—The price established by the State for its lands leased to stockmen ranges from 7 to 12 cents an acre, the land being classified in value largely according to its stock-watering possibilities.

The average price for the entire State is 8½ cents an acre. This land is generally of excellent grazing value and considerably above the average of what remains of the public domain in that State.

Montana.—An average price of 11.3 cents per acre is paid for a large acreage of leased Montana State lands. It is mostly leased in small tracts, generally by sections of 640 acres, and is of unusually high grazing value, some timbered and some areas of open prairie land. The season of use averages five and one-half months, and an average of 12 acres is required to graze one cow, which equals a per head cost for the season of $1.60.

Within the boundaries of the Helena National Forest in Montana over 54,000 acres of Northern Pacific lands in alternate sections are leased to cattlemen at an average price of 8.5 cents per acre. It requires 12 acres to graze one cow. On a per head basis this equals a cost of $1.06 for one cow for the season of five months.

On the Helena and the adjoining Deerlodge National Forests in Montana approximately 101,000 acres of State and private lands are leased for sheep-grazing purposes. The average rent per acre is 12.9 cents, and as the season is short, averaging but a scant two months, the cost per sheep equals a monthly charge of 10 cents a head. This land is of high grade and furnishes unusually fine, fat lambs for the September markets.

Near the Custer National Forest in southeastern Montana a large block of State land and other private land, amounting to 27,000 acres, is leased to a well-known cattleman for 10 cents per acre. It requires 40 acres to support one cow for the 9-month season, which makes a cost of about $4 per head. The year-long grazing fee charged on the adjoining Custer National Forest is $1 per head.

These prices, paid in open market with little or no element of speculation or rivalry except ordinary business procedure and without competition through bids, may well be accepted as the average prices which stockmen are now paying for western range grazing lands in fairly large blocks. These areas, however, are all of much higher grade as to feed and water than any public domain lands, and comparative values must be used in studying them.

INDIAN LAND LEASES

The grazing lands within the various Indian reservations, such as the Apache Indian Reservation in Arizona, the Crow and Cheyenne Reservations in Montana, the Pine Ridge in South Dakota, and the Colville and the Yakima in Washington, are all leased to stockmen under competitive bids. The leases run an average of five years, and in subsequent years the original lessee is given an opportunity to renew his lease at the highest bid should his own bid be exceeded by some other bidder.

The Apache Indian lands up to 1923 cost the stockmen about $1.40 for one cow and 45 cents for one sheep for the yearlong season. The Indian Service is now (1925) trying out a new and somewhat novel plan for the basis of the fees on this reservation. Instead of an arbitrary price per head, the lands are valued on a basis of 7 per cent of the price received for yearling steers during the previous year. Thus, if steer prices rise, the fees rise; if they go down, the fees are reduced proportionately. In other words, if yearling steers raised in the reservation averaged $20 per head for 1924, the grazing fees for 1925 would be $20×7 per cent=$1.40.

Two large tracts of the Crow lands brought 10 cents per acre, making a cost per cow of about 40 cents per head per month, and one tract for sheep brought 17 cents per acre, or at the rate of 10.3 cents per head per month. Another large tract on this reservation brought 21 cents a head for cattle, making a cost per cow of 35 cents per head per month.

An interesting point was developed in the study of these Crow leases. The two tracts of land that brought 10 cents an acre covered 628,832 acres which could be used with safety for but seven months of each year. It required 30.1 acres to carry a cow for this period, which made it cost 40 cents a month per head for one cow or $2.80 for the season. The other tract covered 346,262 acres and could be used for a full 12 months. It was leased for 21 cents an acre, or over twice what the first tract brought the Indians. Its carrying capacity was, however, one cow to every 20.1 acres, which cut down the actual grazing

cost to 35 cents per head per month, or $4.20 for one cow during the whole year.

Not only was the second tract a better one for the stockmen on the basis of actual cost of the feed, but being smaller in size and more compact, it naturally required less fencing, less fence riding, fewer men to ride the range, smaller investment in repairs, watering places, and such other matters, than the larger area. Taking all these items into consideration, the second tract might well have brought 25 cents an acre and then have provided cheaper grass than the other. These figures illustrate very forcibly the absolute need for a careful, systematic survey of every unit of a grazing area offered for lease or purchase in order that, through the carrying capacity figures, the owner as well as the prospective lessee may know exactly what the land is worth for stock-grazing purposes. Such a grazing study and estimate may well be compared to an invoice of property on hand previous to a sale of a merchandising business.

On the northern Cheyenne Reservation, in Montana, an area of 100,000 acres is leased for 16 cents per acre, making a cow cost of 27 cents per head per month, or $3.24 for the year-long season. The Pine Ridge Agency lands cost the cattlemen 30 cents per head per month. The average season is 7.7 months. On the Colville Reservation, in Washington, the Indians lease their lands for sheep grazing principally, the cost per sheep being 1.5 cents per acre, or 4.4 cents per head, per month. This range is distant from the ranches and shipping points, and of somewhat low grade and carrying capacity.

On the Yakima Reservation the charge for sheep range over a period of 11 years is 14.7 cents per acre, making a per head cost for sheep of 16.2 cents per month.

With the exceptions noted, these Indian grazing lands are all of a much higher value for livestock grazing than the best of the public domain lands, and must be considered and compared on that basis.

FORAGE PROTECTION NEGLECTED IN LEASES

It is a matter of great surprise to discover that in a large number of grazing leases reviewed, covering the grazing use of State, Indian, and privately owned lands, the owners, with very few exceptions, took no steps to protect their lands from injury through overstocking and overgrazing. Probably 95 per cent of the leases studied or examined in the range-appraisal work of the Forest Service were absolutely silent on this very important point.

The lands covered by these leases are owned by States, corporations, individuals, etc., and some by the Federal Government itself. Only here and there throughout the range region have a few individual owners availed themselves of the experience and studies of the Forest Service. These have placed in their grazing leases some of the more vital stipulations which that Federal organization places in every grazing permit issued, either specifically or through reference to the grazing regulations concerning such matters. Some of these are: The exact number of stock to be grazed, the seasons of use, distribution of stock on the range, salting plans, and water supply.

Where private lands are inside the national forest boundaries and intermingled with the Government-owned lands the enforcement of the stipulations of the Forest Service gives the private lands practically the same protection the Government lands receive. There are, however, millions of acres of grazing lands in private ownership that have been used for many years past entirely at the option of the lessee, regardless of any injury to the lands and forage cover through the presence of the stock. Object lessons along this line can be seen in every western State where private or semiprivate lands are being leased to stockmen for grazing purposes.

The lack of limitations or restrictions in the use of these private lands has been repeatedly referred to by the stockmen as giving them a higher leasing value than the national-forest grazing lands on which such restrictions are being enforced.

MANAGEMENT OF NONFEDERAL GRAZING LANDS

TEXAS LANDS

Texas has aptly been described by one writer as "the great livestock hive from which swarmed the cattle which now cover the whole plains region." Standing at it does, at the head of all the States in area, and considering

that the livestock industry in Texas is the paramount one and the grazing of cattle and sheep on the open ranges in the West may be said to have originated and reached its highest state of development on the great grassy plains of that State, it is fitting that any study of range management, development, and leasing should begin there.

Under the first treaty of annexation in 1844 the Republic of Texas surrendered all her public lands to the United States. This treaty, however, failed of approval by the United States Senate, for which Texas should be everlastingly thankful.

A second treaty was then drawn up in March, 1845, which was approved by the Senate; but evidently the Texans had reconsidered the idea of turning over their immense landed property, for this second treaty expressly reserved to the new State all the lands owned by the Republic.

Texas was primarily an open-range country, and naturally the question of the use of the vast bodies of fine grazing land belonging to the State soon became a matter of public concern. Many years of agitation and lawmaking followed, with the result that about the time the first real discussion as to the grazing use of the public lands in the other range States began to take shape the people of Texas had already given this matter much consideration and had established a fairly definite policy for handling their lands.

In the early days of the Texas Republic all public lands were sold for the benefit of the Republic, the receipts to go into the public treasury for general support of the government; but in 1839 the legislature of the Republic passed an act devoting certain of the State lands to educational purposes. This law provided that—

"None of the lands so appropriated and set apart by this act * * * shall be disposed of in any manner except by lease * * * and none of said lands shall be disposed of by lease for a longer period than three years."

This is the first law on record covering the leasing of public lands for livestock raising purposes or the funds secured thereby to be applied to the benefit of the public schools.

The Texas State constitution of 1845 continued this lease idea in force, but extended the period to 20 years.

In the years following its annexation to the United States, as the State settled up, Texas lands were a source of much local friction and of constant discussion. By far the largest part of the State was then unorganized and the lands of course unsurveyed. Squatters went onto them and inclosed or handled them to the exclusion of others, the State laws were flouted, and squatter sovereignty prevailed, backed generally by the squatter's firearms. This led to the passage of an act in 1879, the preamble of which was as follows:

"Whereas, many persons in this State have inclosed a large portion of the public free-school lands and have thus severed them from the public common and are using them for pasturage to the exclusion of all others," etc.

In such cases the act above cited provided that persons so inclosing the State lands for their own use should be charged annually $25 a section for such use. As far as can be traced, this was the first value by sections placed upon grazing lands in this country; but it was undoubtedly a penalty rather than an actual valuation, for at that time State lands were selling for very low figures, frequently as low as 10 cents per acre, for what is now considered high-class grazing land. As late as the year 1899, the writer was offered a solid body of 10,000 acres of unusually well-sodded grazing land in the vicinity of Amarillo, Tex., for $1.25 an acre, 25 cents an acre down and the balance in 40 years' time at 3 per cent interest—and turned it down as too high priced for cattle-raising purposes.

For several years, especially between 1876 and 1886, the question of free grass or leases was a burning one in Texas. The State government found itself in much the same position as did the Federal Government in later years when Federal forest officers undertook to regulate the use by stockmen of the grazing lands included in the national forests. The stockmen, especially in the western half of the State in the "Pan Handle" section, had used the grazing lands for so many years without lease or restrictions of any kind that, like the users of the public domain, they believed they had in some way secured what they delighted to call an "inalienable right" to use the public (State) lands when, how, and as they pleased.

The penalties prescribed by the Texas laws were seldom enforced, and the State was losing thousands of dollars through the unlawful inclosure and use of its lands by stockmen grazing all kinds of livestock.

Continued agitation in Texas resulted in the passage in April, 1883, of a revised and improved lease law, which placed all the State lands in the hands of a State land board, repealed all past laws, and set up a very definite plan for issuing leases to stockmen, farmers, and other citizens who desired to use State lands. The law limited the amount of land to be sold to one person at one section of agricultural or seven sections of unwatered pasture land. At first the leasing charge was uniformly 4 cents per acre per year for the maximum period of 10 years. In a year or two the State land board raised the price to 8 cents per acre. This resulted in a State-wide fight against the whole leasing proposition, and the fight for free grass versus the lease law was renewed with great bitterness. Fences were cut, miles of grass lands burned over, and a state of lawlessness existed that covered a large part of the State, especially in the Pan Handle region.

In an effort to prevent further friction the State legislature in April, 1887, passed a new lease law much stricter than the law of 1883, providing severe penalties for its violation but not raising the lease price per acre. Under this law the old land board was done away with and the sole responsibility for carrying out the law placed with a State land commissioner. Agricultural lands were to be leased at $2 per acre. The period of the leases was placed at six years with certain exceptions.

This act was further amended in 1891, the lands being classified by counties, so that in certain semiarid western counties where open-range conditions prevailed it could be leased for 10 years; elsewhere for not to exceed 5. The 4 cents charge per acre was continued, however, excepting in the case of lands belonging to the State university, which were allowed to be leased at 3 cents an acre. Just why the university lands were leased for less is not clear. Certainly they were so intermingled with the rest of the State lands as to make them equally valuable for grazing purposes.

Following the passage of this law there was considerable agricultural settlement of State lands in western Texas. As a result, however, of lack of the usual rainfall and of adverse financial conditions in the early nineties, almost all the purchasers as well as lessees failed to make their payments, and conditions again became serious all over the State. Another land law was passed in 1895 and amended later by the legislatures of 1897 and 1901. Under these changes the minimum sale price of grazing land was reduced from two to one dollar an acre, and the agricultural lands from $3 to $1.50 an acre interest on deferred payments reduced from 5 to 3 per cent, and payments allowed to run for 40 years.

The lands were to be leased to the highest bidder, and the minimum price per acre was placed at 3 cents.

In general the lessees were protected from settlers entering the inclosures and turning stock loose; also, at the expiration of the lease the lands were to lie open for 60 days, during which time they could be sold to the highest bidder, the original lessee having the first right to purchase the land. He was also a preferred lessee in the event there proved to be no purchaser.

Beginning about the year 1904, the dry-farming idea swept over the semiarid West, finding in the region west of the one hundredth meridian almost ideal conditions for that sort of agricultural activity. This brought about a transformation quite as remarkable and far-reaching in its effects on the general conditions in the range States as was the discovery of gold in California to economic conditions in that State.

In Texas, lands which had previously been considered useful only for cattle and sheep grazing, with little or no surface water, a rather low precipitation, and valued at from one to two dollars an acre, were transformed almost in a day to real farm lands. A regular fever of speculation ensued. Eastern land colonizers brought in trainloads of land-hungry people, who bought the lands at comparatively high prices and turned the old-time cow and sheep ranges into cotton and wheat fields; and instead of an occasional shipping pen for livestock, grain elevators and cotton gins were erected along the railroad lines. For these reasons the present prices of grazing lands in Texas can not be used as a guide to range values in other western grazing States. It was simply a case of suddenly discovering the highest economic value of these lands.

As a matter of fact, however, while the Texas lease laws served an excellent purpose, none of the several laws passed for their management had in view anything but the mere administration of them as a revenue-producing resource. There was absolutely no thought of restricting the number of sheep or cattle to be grazed on a section or requiring even the most elementary

efforts to preserve the forage on the lands from complete extinction. A rotation in use or any system of protection which would allow the grasses to reseed and reproduce themselves never seems to have entered into the plans of the officials in charge of the State lands. The strict enforcement of the Texas lease laws did result in greatly improved local conditions, the State revenues were proportionately increased, while the security of occupancy under them was a great factor in establishing the range livestock business in that State on a more satisfactory basis than it had ever been before.

With the full enforcement of the lease law and the protection it afforded, came a strong demand for better blood all over western Texas. Millions were spent in obtaining the best bulls in the country, and the present uniformerly high grade of west Texas cattle is due in great part to the stability which came to the industry with the firm establishment of the State lease law and the ending of the uncertainties as to tenure of use, which existed before that time.

Nevertheless these wonderful Texas ranges continued to deteriorate for some years, even under private ownership, and stockmen seemed utterly oblivious to the fact. For years the grasses and forage plants had been so plentiful and new, unused ranges so readily available when the stockmen cared to move on, that the word "inexhaustible" was in almost universal use when speaking of grazing resources. If the feed did seem to be short, they had but to drive their herds a little farther west onto new areas used previously only by the game animals. Only under such conditions can their shortsightedness be understood. Fortunately for their future values, farseeing State officials began an educational propaganda which proved so effective that the major portion of the fine grazing lands of west Texas are to-day in excellent shape and being used with a full and keen appreciation of the value of, and necessity for, their reasonable care and management.

OTHER STATE LANDS

All of the western range States have been granted more or less of the public domain inside their boundaries upon their obtaining statehood. Almost universally each has been granted sections 16 and 36 to provide funds for the support of the public schools within the State. When Arizona and New Mexico were admitted Congress gave both of them not only sections 16 and 36, but also 2 and 32 for school purposes. A number of other States were granted additional sections for certain specific purposes, sometimes as an outright gift for public use, but generally for the aid and support of public institutions, colleges, mining schools, universities, etc.

In the case of some of the grants of land shortly after the Civil War, no restrictions were placed upon sales or leases. This resulted in their being disposed of at prices perhaps fully up to their value at that time, but far less than they would have brought had they been leased instead of sold and held until such time as the settlement of the State naturally increased their value.

Undoubtedly the one wise plan in handling such lands would have been to forbid forever their sale and alienation by the States, depending entirely upon the sums received from leasing to supply the schools with funds. In this way the increases in value would have inured to the State, and, what is far more important, these funds would have been flowing in regularly year after year providing a regular, dependable income for the schools. Instead, in many instances the lands have been sold at what now seems very low values, and the receipts frittered away with little or nothing now left to show for the money. True, in private hands they produce revenue from taxation, but taxation is always a burden on the property owner, while the constant revenue from the leases would have made the sums available without resort to taxation.

In addition to the four school sections granted to the new States of Arizona and New Mexico, Congress gave them outright sufficient other public lands to make the grand total of such lands turned over to them by the Federal Government equal to more than twelve million acres for each State. Congress wisely placed some restrictions on these gifts to the two new States with the idea of preventing their dissipation under careless administration by State officers. The important restrictions were, in part, as follows:

1. No land to be sold or leased except to the highest and best bidders at public auction after due notice given by advertisement in the county in which the lands were situated. The following proviso, however, made the original

restriction somewhat ineffective; "but lands can be leased only for periods of five years or less without such advertisement."

2. No lands suitable for agriculture were to be sold for less than $25 an acre in either State, agricultural lands being described as those "which are or shall be susceptible of irrigation under any projects now or hereafter completed or adopted by the United States under legislation for the reclamation of lands or under any other project for the reclamation of lands."

In Arizona no class of land was to be sold for less than $3 an acre. In New Mexico lands other than those suitable for agriculture lying east of a certain specified line were not to be sold for less than $5 an acre, while those lying west of this line could be sold for not less than $3 an acre. The grazing value of the two groups justified the difference in the sale price.

The State legislatures subsequently placed several restrictions about the sale or lease of the lands, intended to keep them from getting into the hands of large operators or being sold for prices far below their true value. No Arizona lands may be leased for periods exceeding 20 years, and the law requires the leasing value to be reappraised at the end of each five-year period.

It is interesting to note the acreage of these lands now under lease to stockmen or already sold.

The report of the New Mexico commissioner of public lands for the biennial period ending December 26, 1922, the last report available, shows the following:

	Acres
Under grazing leases	7,559,000
Under oil leases	1,500,000
Sold under contract	2,621,000

The Arizona report as of May, 1923, shows a total of approximately 7,300,000 acres of State lands leased for grazing purposes.

In New Mexico the grazing lands are leased at rates based upon a minimum of not less than 2 per cent of the appraised value of the lands. According to the report the general average for New Mexico is about 3½ cents an acre for such lands.

In Arizona the last available State report, May, 1923, places the average lease price at 3 cents an acre.

Lands in New Mexico, after being advertised and sold at public auction, may be paid for in cash or for a one-tenth payment down and the balance on 30 years' time with interest at the rate of 4 per cent.

In Wyoming the State laws have fixed the selling price of all State lands at a minimum of $10 an acre and restricted the leasing of more than 640 acres to any one person, firm, or corporation.

AUSTRALIAN LANDS

Australia, a country of vast semidesert areas similar in character and climate to much of our arid and semiarid areas west of the one hundredth meridian, has been struggling for years with this question as to the wisest economic use of certain of her public lands. Australia has about the same gross area as the United States exclusive of Hawaii and Alaska, or nearly 2,000,000,000 surface acres.

Methods of farming followed in the mother country were not at all applicable to the vast waterless regions in most of the Australian States. The first settlers quickly realized that it was largely a grazing proposition. Free use of the Government lands, such as the pioneer stockmen in this country enjoyed, did not appeal to the Australian settlers. They had the British idea of absolute possession of land either under direct ownership or lease.

Except for the comparatively small areas suitable for ordinary agriculture, the acreage required to maintain on native pastures one head of either sheep or cattle in Australia was so great that all thought of direct ownership seemed out of the question. The profitable utilization of such lands could only be undertaken through large, strongly financed outfits prepared to handle either sheep or cattle in great numbers and under the most economical plans possible. Thus the early adventures of the Australian Government into leasing their grazing lands were upon rather broad lines as far as acreage, years of lease, and charges were concerned.

Beginning about 1900 the Government lands in South Australia were leased in blocks unlimited in size for a period of 42 years at 12 cents per square mile for the first 7 years, 25 cents for the second 7 years, and 37 cents for

the third 7 years. For the remaining 21 years the charge per square mile was to be based upon a charge to equal 4 per cent of its agreed valuation.

In New South Wales the leases were for 40 years with a revaluation every 10 years, to be made under the direction of the Commonwealth land board. The charge in any event was not to be below 37 cents per square mile, or an annual rate of 14 cents per head for sheep. About the same prices and conditions prevailed generally throughout the other Australian States, the leasing period running from 25 to 40 years with the right reserved by the Government to revalue the lands for leasing purposes every 10 years.

Within the past few years there has been a general revision of the land laws all over Australia, the tendency being to break up into smaller units many of the huge grazing leases and to give men of small means an opportunity to obtain lands in units of from ten to twenty thousand acres. On the basis of the carrying capacity of the average lands in Australia, a tract of 20,000 acres is not unduly large. These the Government called "grazing farms," which, except for size, may well be compared with our 640-acre grazing homestead bill of 1916.

All the Australian States reserved the right to a revaluation of these smaller areas at stated times—in Victoria at the end of 7 years; in New South Wales, 15 years. In New South Wales the new leases require the lessee to reside upon the land continually and to fence it within five years from the date of lease.

Queensland allows as high as 60,000 acres under one lease. The minimum annual rental is 3 cents per acre. Each tract must be completely fenced within three years from date of lease. Two or more men may go in and fence their outside boundaries only, but in such cases the total amount inclosed in a single tract shall not exceed 20,000 acres.

In Western Australia the Government handles the grazing lands mainly on a rainfall basis, the prices being established by a sliding scale under a Government rainfall table. Here the rates are as low as 72 cents per thousand acres where the land is leased in blocks of not less than 20,000 acres to one person. All pastoral leases expire automatically in 1928, when revaluation and releasing will occur.

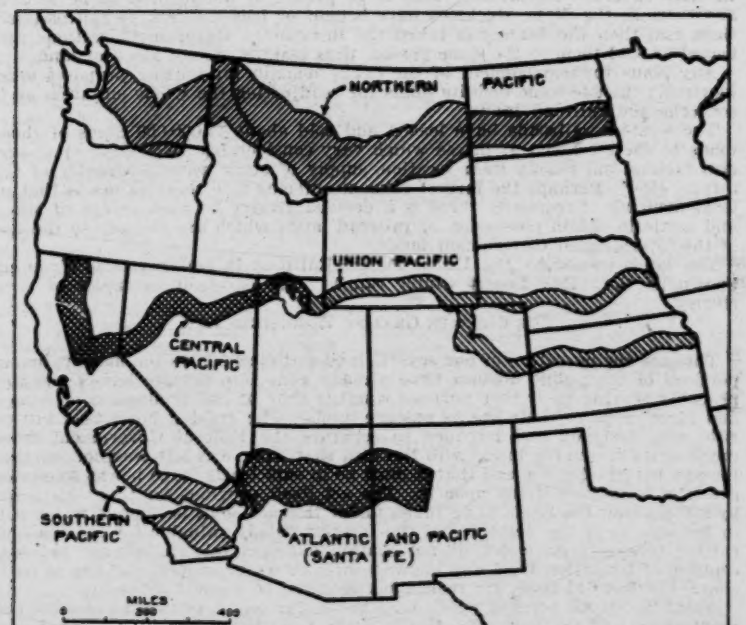
Some of the problems in this far-away land are very interesting. In Queensland they have huge areas infested with prickly pear (*Opuntia* spp.), a plant imported into the country by a pioneer under the impression that it would be a valuable forage plant. Like the imported rabbits, it has spread with appalling rapidity until the very existence of the livestock industry in certain areas is threatened by its devastating presence. Such pear-infested lands may be leased for 25-year periods in blocks not to exceed 2,560 acres, at very low rates, with the understanding that the lessee clears a certain acreage each year. In selling such lands, a deed does not issue until two full years' time has expired, in order that the Government authorities may be satisfied that the new owner has actually cleared the land of the pear. In some sections the State pays the settler for clearing this pear land and eventually gives him a deed free of charge excepting for the land office.

Relation of Public Domain Lands and Railroad Grant Lands in Grazing Management

In addition to other alienations, Congress many years ago granted large amounts of public land to a number of western transcontinental railroads to aid in their building. These covered over 158,000,000 acres, the major portion of which is grazing land located in alternate sections, with the idea that to allow the railroads to secure their lands in larger single bodies than 640 acres would prevent regular and even settlement of the region involved. Little was then known of the character of these lands. At that time 640 acres seemed a large tract to the average person. As a matter of fact, had these lands been granted in larger bodies as by full townships (23,040 acres) instead of by sections of only 640 acres, the regions would undoubtedly have prospered far more than they have as far as concerns settlement and improvement of these lands. The reason for this is obvious. No stockman could afford to inclose so small an area as 640 acres of land suitable only for grazing under arid or semiarid conditions. Granted by township, there would have been acreage enough to have justified fencing it. It would thus have found its way readily into individual hands under which it would have been far better administered, and more taxes would have been received by the

States. These lands were granted in strips along each side of the track, the Northern Pacific grant being 80 miles wide, 40 on each side the track, with a further 10-mile strip intended to furnish additional or lieu lands from which to make selections to meet the loss in acreage that had already passed out of the Government's hands in the original strip before the grant was made. This included Indian and other reservations, homesteads, unperfected claims of settlers, etc.

Congress took a rather peculiar attitude toward the prospective settlers on the Government sections intermingled with all these railroad grants. This



Map Showing 4 Principal Railroad Land Grants in the Far Western States. These Grants are of Alternate "Odd Numbered" Sections 640 Acres. The Northern Pacific, and Atlantic and Pacific (Santa Fe) are 80 Miles Wide With an Extra Strip of 10 Miles as "Lieu Lands" to Cover Lands in Private Ownership, Indian Reservations, etc. in Original Grant. The Southern and Central Pacific Grants are 40 Miles Wide With No "Lieu Land" Provisions.

was accomplished by increasing the price of such lands either sold to settlers outright or paid for under the law allowing them to "commute" their entries by paying cash for the land. The stated price under ordinary conditions had always been $1.25 an acre. But the railroad grants all contained a proviso raising this to $2.50 an acre for all Government lands inside them. In all probability the Federal Government has been fully paid for the gift of lands to the railroad by this extra $1.25 collected from settlers within these huge railroad grants.

The map on this page shows the location of the largest of these western railroad grants. Interwoven as they are with the public domain, these alternate sections offer one of the greatest problems in any successful management of the public domain. Stockmen can of course buy the railroad sections, but

there is at present no Federal law which will allow them to secure title to the other sections in Government ownership excepting in single 640-acre tracts. Further the Federal laws absolutely forbid the inclosure of Government lands, which of course prevents the owner of the railroad sections from inclosing his lands excepting by single sections. This being economically impossible, the railroads or their lessees are unable to manage their lands with any great success. Where stockmen are using the intermingled public lands they secure the use of the railroad sections as well, it being almost impossible to prevent trespass upon them except under State laws generally difficult of enforcement. In Arizona and New Mexico, with large grants of public land to be located anywhere in the State, stockmen have bought or leased alternate railroad sections and then the State has taken the interwoven Government sections and leased or sold them to the same person, thus making a solid block of land.

Any plans for management of the public domain for grazing purposes must inevitably include some definite plans for readjusting the whole situation as it concerns the railroad lands.

The western railroads have leased and sold about 17,000,000 acres of these lands to the stockmen at prices which vary considerably, depending upon several factors, but chiefly their location, supply of stock water, character of the forage, etc.[14] Perhaps the largest element entering into these values is that of local demand. Frequently there is a decided rivalry between ownrs of sheep and cattle to obtain possession of railroad lands which are the key to the use of the intermingled Government lands.

The lands owned by the Union Pacific Railroad in southwestern Wyoming known as the "Red Desert winter ranges" are excellent examples of such rivalry.

The 640-Acre Grazing Homestead Law

Through the operation of our several land settlement laws the more valuable portions of the public domain have already gone into private hands and are probably serving their best purpose whether that be the production of forage and farm crops or their use as pasture lands. The grazing homestead bill of 1916 was designed and intended to separate the Federal Government from much of its remaining lands with the idea that what was left was not suitable for any but grazing use and that it must be in sufficiently large blocks to enable a settler to make a living upon it. The act itself provides for this very point by stating that the lands to be taken under this act shall be those "which are in the opinion of the Secretary of the Interior chiefly valuable for grazing and raising forage crops, which do not contain merchantable timber, are not susceptible of irrigation from any known source of water supply, and are of such character that 640 acres are reasonably required to support a family."

About 20,000,000 acres of public land has so far been classified as meeting the requirements of the law. Practically every tract listed has been entered and an attempt made to use it in accordance with the theory that it would furnish the feed for enough livestock to support a family. Considering that on certain well-known land grants in the southwest, the Maxwell Grant for example, conceded to be of unusually high grazing capacity, it requires not less than 30 acres to support one cow for the yearlong period, this means about 20 head of cattle to each homesteader as the maximum such grazing lands will support.

The average, however, will fall below 10 head to the section. It is obvious that no American homeseeker will be able to eke out the most elementary living under such conditions and with so small a number of stock.

It would be extremely interesting to know the percentage of settlers who have made good on these grazing homesteads. Personal observation indicates that an extremely small number have done so. In the main the persons applying for such lands have been speculators and not bona fide settlers intent upon carving a home for themselves out of such lands. Soldiers of the late war are given credit for the time spent in service which so reduces the time necessary for living upon the land that they are able to secure title within a year. The law requires the homeseeker to expend not less than $300 on each 640-acre claim. This would not cover much more than a rough shack in which to reside, digging a well, constructing a corral and a mile or two of barbed-wire fence. He can also be absent from his claim for a full five months in each year.

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[14] Dept. Agr. Yearbook, 1923, p. 525.

Assuming that the lands would have a sale value of even $3 an acre—about all any stockman can afford to put into such land under average range livestock-raising conditions—this would mean a return of about $2,000 for a year's time, a fair return for the speculator.

A large colony of such settlers in the Rio Grande Valley of northern New Mexico, west of the town of Taos, visited in 1922, was composed mostly of veterans and young men from near-by towns, school-teachers, clerks in stores (many of them women), almost none of them practical stock raisers. Few of them intended to live permanently upon their tracts. They were for the greater part hauling water for domestic purposes as well as to water the few head of livestock they owned—a milk cow or two, a few horses for work purposes, chickens, and here and there among the Mexicans small bunches of goats for meat and milk.

Part of the colony obtained their water from the Rio Grande, which they reached over a road down the side of the canyon with a drop to the river of probably 3,000 feet. The water was dipped from the stream in buckets and poured into barrels. Six or seven barrels was about all an ordinary team of horses could pull up the stiff grade. Others were getting their water from the Denver & Rio Grande Railroad, which crossed the valley and which sold them the water delivered at their railroad station at the cost of hauling, "as a matter of real charity," one railroad official informed the writer. Most of these people hauled the water from 8 to 10 miles over very poor roads.

Here and there a little dry farming had been attempted, but in the main the crops obtained would not return the seed. A little forage in the shape of cornstalks or low-grade wheat or oat hay was about the best that was done. Of 30 or 40 heads of families interviewed on this tract not one had the least intention of remaining upon his land a single day after patent was secured.

In eastern Montana and Wyoming conditions in 1922 and 1923 were not quite so bad as regards water, and occasionally with good summer rains a fair crop of rough forage such as feterita, sorghum, and kafir was raised. The intention of the settlers to remain on their land in these regions was not in any respect different from the same kind of settlers in other regions. One and all were looking for some stockman to come along and buy them out. As far as developing the region and adding citizens and taxpayers to the State was concerned, the law has apparently been a complete failure, excepting that eventually 99 per cent of it that goes to patent will undoubtedly come into the hands of stockmen at prices which they can afford to pay and thus get back to its original condition and use as range for livestock.

Under this law certain settlers under other Federal land laws, or owners of tracts of farming lands who have not received from the Government a total of more than 160 acres of land, may secure enough additional land as 640-acre homestead land to make the total ownership not exceed 800 acres of land of every kind. The real beneficiaries of this law have been such settlers. Under it they have been able to add to their holdings adjacent areas of grazing land that have been of considerable value in their farming operations and added materially to the successful handling of the livestock. To this extent this law has justified its place on the Federal statutes.

Efforts to Provide Legislation for Control of Public Grazing Lands

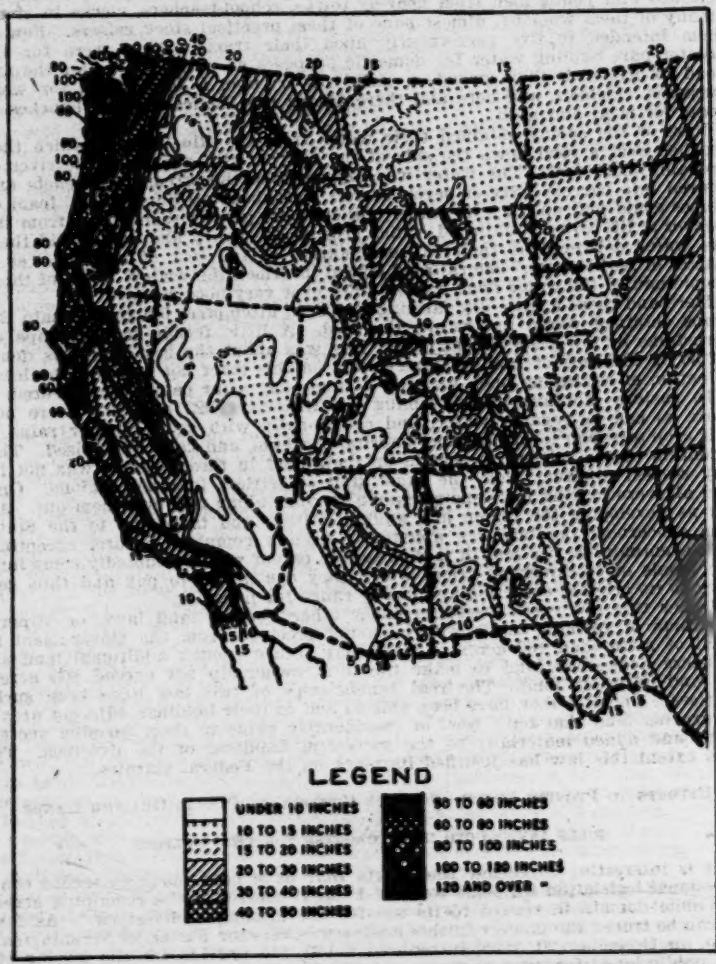
BILLS INTRODUCED INTO CONGRESS FOR THIS PURPOSE

It is interesting to review the efforts that have been made to secure congressional legislation for some form of Federal control of the remaining acres of public domain in regard to its use for the grazing of livestock.[23] As far as can be traced the pioneer in this matter was Senator Foster, of Washington, who, on December 20, 1899, introduced a bill "to provide for the leasing of the public lands for grazing purposes and to produce revenue for agricultural development." This bill was frankly an effort to raise money by leasing the public lands. Nothing came of it, however, as far as congressional action was concerned; but during the next two or three years Senator Foster's bill stirred up a vast amount of discussion on this subject at every livestock meeting held throughout the western range States.

On April 3, 1906 (59th Cong., 1st sess.), Senator Burkett, of Nebraska, in recognition of the growing sentiment along this line, introduced a bill (S. 5511)

[23] See references to Powell plan and Kentucky law, p. 1613.

providing for "the control of grazing upon the public lands in the arid States and Territories." This measure authorized the President, with the consent of the governor of the State or Territory affected, "to establish by proclamation grazing districts upon the public lands of the United States." The Secretary of Agriculture was designated to administer these districts and "to



AVERAGE ANNUAL PRECIPITATION

charge and collect reasonable fees for grazing permits." This measure was not wholly satisfactory to the stockmen, who desired, among other things, that the charge should be specifically mentioned in order that there might be no question as to what a "reasonable fee" was.

On January 8, 1907 (59th Cong., 2d sess.), Senator Burkett introduced a bill (S. 7618) "providing for the control of grazing upon the public lands in arid States and Territories of the United States."

A TYPICAL 640-ACRE GRAZING HOMESTEAD, NORTHERN NEVADA

Pure sagebrush range

1628—1

SETTLERS ON 640-ACRE LANDS IN NORTHERN NEW MEXICO HAULING WATER FOR DOMESTIC PURPOSES TO THEIR RANCHES FROM WATER-TANK CARS ON THE RAILROAD

In several instances the distance was more than 10 miles

SETTLERS ON 640-ACRE GRAZING HOMESTEADS IN NORTHERN NEW MEXICO HAULING WATER FOR THEIR STOCK AND DOMESTIC USES FROM THE RIO GRANDE, A DISTANCE OF MORE THAN 10 MILES

The canyon at this point is several thousand feet deep

1628—2

This bill authorized the President to establish by proclamation grazing districts upon the unreserved, unappropriated public lands of the United States, and placed the administration of them in the hands of the Secretary of Agriculture. It left out all reference to cooperation with the governor of the State but retained the phrase "reasonable fees." No appropriation of funds was made for carrying out the provisions of the act.

On February 11, 1907, the Senate Committee on Agriculture and Forestry held public meetings in Washington, D. C., for considering this Burkett bill (S. 7618) and other measures proposed for some control of the public domain grazing lands. A large number of western stockmen were present. The chairman of the grazing committee of the American National Live Stock Association, Mr. A. E. De Ricqles, of Denver, Colo., presented the following resolution:

Resolution unanimously adopted at the tenth annual convention of the American National Live Stock Association, held at Denver, Colo., January 23, 1907

"*Be it resolved*, That the American National Live Stock Association, in convention assembled, does heartily indorse and approve the plan of the national administration to classify and put the grazing and unoccupied public land under the control of the Department of Agriculture for grazing purposes under some system of lease or grazing permit, protecting the interests of all concerned and working an injury to none; and be it further

"*Resolved by this convention*, That we respectfully request the President of the United States to appoint a committee of practical stockmen from the States and Territories where the land is situated to confer with the Department of Agriculture and the Public Lands Commission as to the most equitable and effective law to be passed on this subject.

"A true copy.

"T. W. TOMLINSON,
"*Secretary American National Live Stock Association.*"

After several days of hearings the committee issued a printed report of its discussion, published as part of the Agricultural appropriation bill of 1907. No recommendations were made covering the passage by Congress of any grazing control bill, the committee being unable to agree on the matter. This was the only grazing bill the Senate committee has ever held public hearings upon or given any serious consideration.

Senator Burkett on December 21, 1907 (60th Cong., 1st sess.), reintroduced as S. 2968 his bill (S. 7618) of the Fifty-ninth Congress, with some changes in its provisions. Under this third Burkett bill the President was to establish grazing districts and the Secretary of Agriculture was to administer them. He was directed to "charge and collect reasonable fees for such grazing permits, based upon the grazing value of the land in each locality." Two hundred and fifty thousand dollars was set aside for the administration of the law.

The third Burkett bill (S. 2968) left out the clause providing for the consent of the governor of each State, but created a committee to be appointed by the governor of each State, which committee was to establish certain fundamental points as to the division of the ranges, class of stock to be grazed, etc.

Several livestock associations and a committee of the American National Live Stock Association, a western organization the membership of which was composed in the main of far western range sheep and cattle raisers using the public domain to a large extent, demanded that the fee be made more specific and urged that the Burkett bill be amended by stating that "the maximum grazing fee shall be 4 cents per acre and the minimum one-half cent per acre."[35] This committee while specifying 4 cents as the maximum sum to be charged per acre made it quite clear that in their opinion very little of the public domain acreage would merit that price.

On February 18, 1908, Senator Curtis, of Kansas, introduced a grazing bill (S. 5431) which placed the control of the public domain lands for grazing purposes wholly in the hands of the Secretary of Agriculture, but provided for a committee to be selected from users of the range, which committee was to manage the affairs, distribute the permits, and decide on questions and disputes as to priorities, class of stock, etc. In the event this committee could not settle a question by themselves, the Secretary of Agriculture was to decide it for them without any appeal from his decision. This bill followed the lead

[35] Report committee on resolutions, American National Live Stock Association, Denver, Colo., Jan. 22, 1908.

of the Burkett bill and appropriated the sum of $250,000 for carrying out the provisions of the law.

Representative Scott, of Kansas, introduced the Curtis grazing bill in the House on February 20, 1908 (H. R. 17650).

Senator Burkett's three previous bills were followed by a fourth (S. 286), which he introduced on March 22, 1909. This measure differed from the other two as to certain points, none of any great interest.

On February 14, 1910, Senator Curtis reintroduced, as S. 6345, his original bill of 1908.

Senator La Follette, of Wisconsin, introduced a grazing lease bill (S. 3462) December 7, 1911, described as being "for the improvement of grazing on the public lands of the United States and to regulate the same." It followed very closely the lines of a bill suggested by the special committee of range stockmen appointed by the American National Livestock Association under date of January 22, 1908. The La Follette bill increased to $500,000 the funds for administering the law.

On February 10, 1912, Congressman Lever, of South Carolina, introduced a measure (H. R. 19857), which followed very closely the lines of Senator La Follette's bill.

Representative Stephens, of Texas, introduced a bill (H. R. 23582) on April 20, 1912, "providing for the lease of public grazing lands of the arid States and Territories." This measure was almost identical with the then existing Texas State land leasing law. The Commissioner of the General Land Office was placed in absolute charge of the work. He was to initiate the grazing districts, establish the prices to be charged, and carry out the provisions of the bill according to his own ideas. Its plan was to put the land up for bids and issue leases to the highest bidder. It limited the acreage which any one person or corporation could lease to "not more than two sections of watered land and six sections of dry grazing land." All funds for the leases were to "be held by the United States as an educational trust for the exclusive purpose of educating the children of the State in which the lands are located." Exactly the same bill was later introduced by Mr. Stephens on July 8, 1912 (H. R. 25628), in the same session of the Sixty-second Congress.

On December 15, 1913, Congressman Kent, of California, an active western range stockman thoroughly posted on the various questions involved in the grazing of livestock on the open range throughout the West, introduced a bill (H. R. 10539) "for the improvement of grazing on the public lands of the United States and to regulate the same." Of the measures introduced in either branch of Congress this is the only one that secured a public hearing before the House Committee on Public Lands up to the present time, 1925. A number of western stockmen grazing both sheep and cattle appeared in Washington before the House committee, in March 1914, the large majority of whom urged the passage of the Kent measure with some few amendments. The committee, however, failed to report it out, the situation being much the same as with the Senate Public Land Committee of 1907, a majority of the members being opposed to any legislation of this kind.

Senator Gronna introduced on July 10, 1913, a measure (S. 2695) which differed in certain points with most of its predecessors. The President was to establish grazing districts and the Secretary of Agriculture was to lease the lands to settlers and stockmen and establish the maximum acreage that any one person could lease. It authorized the Secretary to have the public domain classified and went into considerable detail as to the personnel to handle the lands, salaries, etc. The charge for the land was "to be determined by official appraisement to be stated in the lease." In no case was the charge for grazing or pasture lands to be "less than one-half or more than 5 cents per acre per annum." The expenses of administration were to be paid out of the receipts, the balance going to the United States Treasury.

On February 23, 1914, Mr. Stephens, of Texas, reintroduced his measure (H. R. 13774) of 1912 with a few changes. The minimum per acre charge for watered lands was 3 cents on a five-year term, while "dry grazing lands" were to be leased at not less than 2 cents per acre per annum, the leases to run for 10 years.

On December 6, 1915, Mr. Stephens reintroduced, as H. R. 336, his measure of 1914. None of the Stephens bills carried an appropriation for administration.

No additional grazing control bills were introduced in Congress until on June 6, 1919, when Senator King, of Utah, introduced, "by request," a range

control bill (S. 1516) which was very short and concise. Under it the President was to establish "grazing commons" on any unreserved unappropriated public lands. These "grazing commons" were to be administered by the Secretary of Agriculture under "such regulations and rules as he may promulgate." No reference was made to fees or their disposition. Fifty thousand dollars was appropriated for administering this law.

In the Sixty-seventh Congress, first session, Mr. Sinnott, of Oregon, on July 25, 1921, introduced a bill (H. R. 7908) "to authorize and regulate the grazing of livestock on the public domain." This was a short bill, but contained a number of new points not found in previous measures along this line. The administration was placed under the Secretary of the Interior, who was authorized to establish a system of controlled grazing on the public domain. The charge was to be based upon the average rainfall. One-half cent per acre where the annual rainfall was less than 10 inches per annum and not more than 1 cent per acre where it was above that amount. Permits were to be issued by the registers and receivers of the various land offices in the West. This bill was supported by the then Secretary of the Interior Fall, an active western range stockman, and was understood to reflect his personal views to a large extent.

On February 23, 1922, Senator Smoot introduced a bill (S. 3236) which was identical with Mr. Sinnott's measure (H. R. 7908).

Senator Phipps, of Colorado, introduced a short grazing bill (S. 2325) on February 1, 1924, "to authorize and regulate and control the grazing of livestock upon the vacant unreserved public lands of the United States in order to prevent overgrazing and promote the development of the livestock industry." Neither this bill nor the Sinnott and Smoot bills carried an appropriation.

Senator Phipps's bill placed the authority for enforcing the law in the Interior Department. Permits were to be issued for 10-year periods and a "reasonable fee" was to be charged.

This completes to date the list of measures which have been introduced into Congress during the past 20 years providing for some kind of control over the public domain when used for the grazing of livestock. As has been stated, Senator Burkett's bill (S. 2968) of 1907 and the bill introduced by Mr. Kent of California are the only ones that have been taken up and given a public hearing by either of the Public Lands Committees, to which they have all been referred, up to the present time in 1925. Both of them, however, followed the trail of all their predecessors and have in turn been followed by those offered later, all of them finding a last resting place in the quiet files of the committees.

It may be said that this failure to "report out" some of these bills has been due mainly to the fact that the stockmen themselves were not in complete agreement with the idea of and plans for some control of the public domain. In the early days the sheep owners almost to a man were bitterly opposed to such a measure. At the hearings upon the Kent bill, however, a number of prominent western sheepmen, as well as many cattlemen, spoke in favor of that measure. But just about that time, 1914, Congressman Fergusson, of New Mexico, was pushing his "640-acre grazing homestead" bill before the same committee. He managed to stir up a tremendous amount of hostile criticism against the idea of tying up the public domain through leases or permits to the stockmen which would interfere with the workings of his grazing homestead measure. This was obviously intended to get into private hands about all the grazing lands left in the hands of the Federal Government that were of any value for production of livestock.

Thousands of letters were received by the committee from small settlers all over the West protesting against the Kent grazing bill and demanding the passage of Mr. Fergusson's measure.

The Fergusson bill was eventually passed, and pending the results of its provisions for cutting down the area of public lands no more grazing bills were introduced for several years.

For several years there were still many million acres of grazing land left that were not applied for under the 640-acre bill, but except for Senator King's "by request" bill of 1919 no attempts were made to secure legislation along this line until in 1921, when Mr. Sinnott introduced his measure.

POSITION OF THE TWO DEPARTMENTS

There has always been a keen but friendly rivalry between the Department of Agriculture on the one hand and the Interior Department on the other as to which should administer the public domain under any measure providing for its grazing control.

The following extracts from a speech delivered by Secretary of Agriculture Houston at the meeting of the "United Stockmen's Association for Federal Control of Public Grazing Lands" held at Salt Lake, Utah, July, 1919, sets forth very clearly the points which the Department of Agriculture believed to favor that department's having charge of this work.

"Our experts tell me that from their present knowledge, if the public domain were put under intelligent regulated grazing it would support in the neighborhood of 25 per cent more animals than it now supports. If that is true it means an economic gain to the producer; it means a great asset to the Nation. If it is true, then it ought to be done as quickly as possible. If it is to be done, by what agency shall it be done? The Interior Department could regulate the grazing on the public domain by duplicating the present service, which seems to me unnecessary. The Department of Agriculture could apply a similar system for the Department of the Interior that it now applies on the national forests, or it could be charged directly with the duty. The fact that the Interior Department has title and will retain title to the public domain makes no difference.

"Grazing is an agricultural problem. The national forests are in the main agricultural problem. Grazing on the national forests, timber control, insect diseases, predatory animal control are all directly or indirectly agricultural problems.

"The only way this great problem could be controlled by the Interior Department intelligently would be to transfer the Department of Agriculture to the Interior Department, but it could be handled by the Department of Agriculture with very little extension of its present service; and waiving all personal or departmental interest in the matter—I don't think that ought to be considered for one moment—we are not looking for additional trouble; we are looking for additional tasks, and there would be additional troubles and tasks—my only concern is what is best for the public domain, and what agency can best handle it? If the Congress of the United States should charge the department with the duty of regulating the grazing and of cooperating with the Department of the Interior in classifying the public domain, it would undertake the task with the single motive of rendering the greatest possible service to the Nation and to the people who are interested in the public domain."

In 1923 Secretary of Agriculture Wallace took this matter up with Secretary Work of the Interior Department. In his reply under date of November 16, 1923, Secretary Work has set forth briefly the views of that department charged with the administration of the larger part of the public lands of the United States. These are as follows:

"It would seem that such regulation of grazing privileges as would prevent overgrazing may be had without in any way curtailing the laws, settlement, and development described. With the administration of all of these laws vested in the Interior Department, it seems only logical and in the interest of good administration that the control and regulation of grazing should also be vested in it, and this applies with equal force to the nontimbered grazing areas now included within national-forest limits.

"It would seem, therefore, that the object sought could be attained and the whole matter best administered by vesting this control in the Interior Department, with authority for the Secretaries of the Interior and Agriculture to cooperate in the work, and by mutual agreement and transfer of appropriations or reimbursements of moneys expended, utilize the field forces of either department, as may be most economical and advantageous, for the protection and administration of the lands involved.

"I will give the subject further study and may formulate proposed legislation along the lines indicated."

Secretary Wallace was so thoroughly convinced of the need for some legislation by means of which the abuses of the public domain by livestock could be stopped or at least reduced that he was willing to waive all claims as to which department should administer it and leave the decision of that matter in the hands of Congress.

In a letter discussing the question of the grazing lands with the chairman of the House Public Lands Committee, Mr. N. J. Sinnott, Secretary Wallace made the following statements:

"To my mind the condition of the unreserved public grazing lands is one of the most serious problems confronting the livestock industry of the West. There remains approximately 185,000,000 acres of such land, much of it

formerly of high value for grazing purposes but now seriously reduced both in quality and quantity of feed through overgrazing and mismanagement due to lack of responsible control. The situation is made even more serious because the presence of such misused lands prevents the best use of a still greater area of intermingled privately owned lands. Failure to regulate the use of these lands is an economic waste which might be promptly and easily checked with resulting general public benefits and with special benefit to that part of the livestock industry dependent upon these ranges. * * * I feel that here is an important public service urgently needed, that action should be promptly taken to restore these lands and to cooperate with the livestock industry in bringing about their better use. As to the matter of jurisdiction, I am not so much concerned about who does the work as I am that it be done, done promptly, and done well. I do, however, suggest for your fair consideration the fact that the 18 years' successful administration of the grazing resources on approximately 100,000,000 acres of public range in our national forests by the Forest Service is strong evidence that this organization is equipped and qualified to demonstrate similar success in the administration of grazing on our unreserved public lands if entrusted with that duty."

Experts who have examined into the use of these grazing lands feel that under some even moderate form of control and protection they can be made to carry at least 25 per cent more stock than they now are and at the same time furnish such an increased amount of forage that the stock will leave the ranges in a much better condition as to flesh and growth than they do at the present time. Also that under regulated use the heavy losses that now occur nearly every year through the overstocking and overgrazing of these lands will be gradually eliminated to the benefit of the stockmen using them as well as the Nation at large.

Within a year students of the subject of food production have predicted a shortage in nearly all our agricultural commodities within what is a comparatively short time as considered from a national point of view. These lands should do their share in postponing this shortage.

SUMMARY

The United States Government controls at the present time an area of public land larger than the State of Texas. About 75 per cent of this is capable of producing livestock, or, at least, aiding in the production by carrying the animals for certain periods of each year and in some instances during the entire year. This relieves the lands owned by local stockmen of the burden of supporting the stock during the entire year, gives the pastures and forage-producing land an opportunity to mature a crop, increasing to that extent the output of livestock in these areas. Based upon a value as low as $1 an acre, this means nearly $200,000,000 worth of public property lying idle. Worse than that, it is deteriorating in value, a liability rather than an asset. It is producing neither revenue to the Government nor returns of any kind to the people of the States in which it lies.

Such conditions reflect seriously upon the good sense and business judgment of those responsible for them.

The further and constant depreciation of these lands within the public domain should not be allowed to continue if there is a remedy. The purpose of this bulletin is to point out the remedy and indicate the method of applying it. Conservation and efficiency in the use of all the national resources of this great country are now being advocated and encouraged in every possible way for all of them excepting this single one—the use of the public domain.

The effects of erosion on the lands can not well be estimated in dollars and cents. If it could the amount involved would be fairly staggering in its immensity. Worst of all, this soil that is constantly being washed away and carried down to the Gulf of Mexico or the oceans can not be replaced artificially. It is the accumulation of ages. When once removed, only the slow processes of nature can restore it.

In the opinion of the writer this loss is alone a sufficient justification for immediate legislation along lines which will tend to check such erosive action.

No matter what plan may be used to regulate the use of these lands it should involve no expenditure of public funds for improvement works and no radical closing to the public of any part of it. Excepting for the first year, and then only for the preliminary planning before the fees begin to come in, the grazing

fees which should be charged for the commercial use of these lands will more than cover the cost of administration. Assuming that about 130,000,000 acres of these lands will be used more or less for grazing and that the average charge will probably equal an average annual fee of as low as 2 cents an acre, the total income from this one source will probably amount to about two and one-half million dollars annually.

The total cost of administering the approximate 100,000,000 acres of grazing lands within the national forests for the year 1924 is estimated at approximately $675,000. Reduced to an acreage cost this is about three-quarters of a cent per acre per annum. These men of course only put in part time on grazing work, which naturally reduces the overhead, as against an organization such as is here contemplated in which the officials would devote their entire time to the grazing work.

The administration of grazing on the public domain will not be as complicated or require as many men as are necessary in handling such ranges on the national forests, where the many questions of forest protection and related matters add greatly to the administrative costs. A careful estimate of the cost of administration indicates that, including all necessary field work, officers, and overhead expenses, it should not cost over $1,000,000 a year to effectively supervise the grazing upon them.

The bill approved by the two Secretaries proposes to use 10 per cent of the annual gross receipts for constructing range improvements in these lands. It would seem advisable to increase this percentage to 15 for the first five years. At the end of that time the Secretary should be empowered to change the ratio if this amount seems too large. It is believed that at the close of the first five-year period the major portion of these improvements will have been made and the item of maintenance would probably thereafter be the largest expense connected with them. Authority should also be granted the Secretary to purchase improvements heretofore placed on these lands by private persons to be used either by permittees or as pastures, headquarters, etc., for the administration officers.

These improvements would for the greater part consist of fences to control the stock; improvement of water resources such as digging out and piping the waters from springs to reservoirs, troughs, etc.; the building of dams of earth or cement to catch flood waters; and in many cases the installation of pumping plants on deep wells. Exploration for artesian water should also follow where there are possibilities for such wells, with the idea of securing flowing streams and thus reducing the cost of pumping, always quite an item of expense in western pacture lands.

For the first 10 years these costs would undoubtedly run into large figures, but they would pay for themselves over and over. There should also be some authorization for the sale of isolated tracts of these lands. It frequently occurs that here and there a section or more of public land is entirely surrounded by privately owned lands. In most cases these lands have naturally been excluded from entry because of their low values for any purpose. It would simplify greatly the management of the private as well as the areas of public land if these isolated sections could be sold under an extension of the present law covering isolated tracts. The present maximum limit for such sales is 160 acres. This should be increased to at least 640 acres and the minimum price of $1.25 an acre lowered to $1 an acre, which will in the majority of instances undoubtedly be much above its actual value. The possession of it, however, will save the adjoining owners of private land some expense in fencing which will about meet the cost and subsequent annual taxation.

The Forest Service has demonstrated in a very satisfactory way the merits of the per capita system for handling livestock on open ranges. This has been fully discussed on page 36 of this report and need not be again referred to beyond the mere statement that the permit or per capita system should be used in handling these public domain grazing lands as against any other method.

The authority granted under the proposed grazing control bill which gives the Secretary the right to make exchanges of public land with the owners of private lands will serve a valuable purpose in solidifying the separate tracts of public lands. Small scattered pieces of land in private ownership intermingled with Government land will invariably cause friction and embarrassment to the Federal officers handling the work. Such exchanges can almost always be worked out to the benefit of both sides. Similar authority should be granted the Secretary of Agriculture in his discretion to eliminate from the national forests purely grazing lands now within the forests but lying imme-

SMALL "SEEP" DUG OUT AND PIPED TO TROUGHS

Under some form of government control improvements upon the public domain ranges similar to this could be made and the water utilized by the livestock. At the present time few stockmen care to spend money on such improvements knowing they can not control its use

WATER PIPED FROM A SUBMERGED DAM IN A CANYON OUT TO THE OPEN RANGE

diately adjacent to the public domain lands and which are not a natural unit of range usable in connection with the management of permitted livestock grazing on the national forests. Many such tracts have been inclosed by the boundaries of the national forests because their elimination would make the boundary line impractical and expensive to maintain and patrol. No such elimination should be considered, however, where the forest lands are not immediately adjacent to the boundary line.

The inclusion of a paragraph in the law authorizing the Secretary in his discretion to work out exchanges with either State or private owners to the end that grants of separate sections may be consolidated into areas of townships, 23,040 acres, or possibly half townships, would be very useful. Such a clause would work equally to the benefit of the Government as well as the private owners. It is perfectly practicable and fairly economical to fence an area of 23,040 acres, a township 6 miles square, for livestock grazing purposes, but not 640 acres. Such a provision will undoubtedly lead to a large number of such consolidations and thus get the lands into the producing class and simplify greatly the work of administering the remaining Government lands.

No definite laws should be passed for the management of these lands, but the whole administration should be left to the Secretary in whose department the work is placed under such rules and regulations as he may deem necessary. These like the rules and regulations of the Forest Service should have the force and effect of law.

It is earnestly recommended that in the event of the passage of such a law it be put into effect gradually, beginning with the public domain lands in but one State. With one year's experience the officials in charge of the work will unquestionably discover flaws in their plans which can be studied and the necessary changes made in their methods before the work is further extended. There will be many puzzling situations developed and many at present unseen problems will present themselves for solution. These can be worked out and the necessary changes made in the regulations and rules under which the work is being handled before its further extension. The judgment of the writer as to which department of the Government shall administer these lands reflects that of the late Secretary Wallace. Their immediate protection is the vital thing. The department which shall do the work is secondary.

The Forest Service with its 20 years of experience in handling the grazing lands within the national forests has accumulated a vast amount of information as well as practical experience which renders the officers of that bureau of the Department of Agriculture peculiarly well fitted to undertake the work. In many instances the proximity of the lands involved to the boundaries of many of the forests make it clear that the forest supervisors and the office forces under them could handle them without any increase in overhead. Many of the permittees using national forest lands are also using the public domain lands in a large number of instances, the two tracts forming a definite unit of grazing land.

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